February 1, 1941

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INDIA RUBBER WORLD

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INDIA RUBBER WORLD

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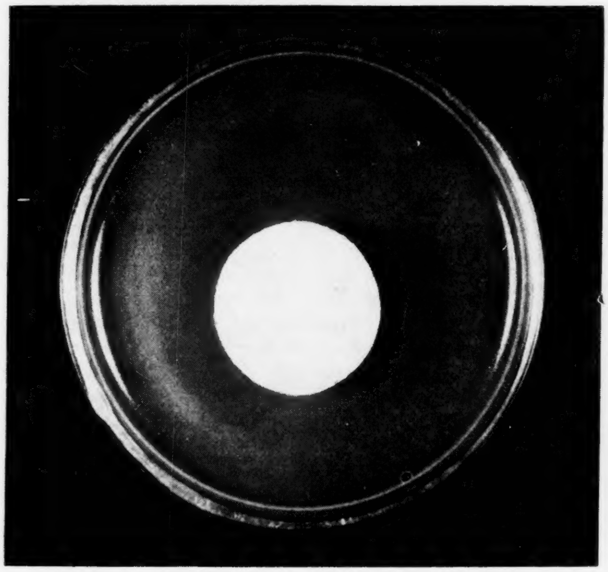
Antiseptics in Latex Goods

Robert A. Engel[1]

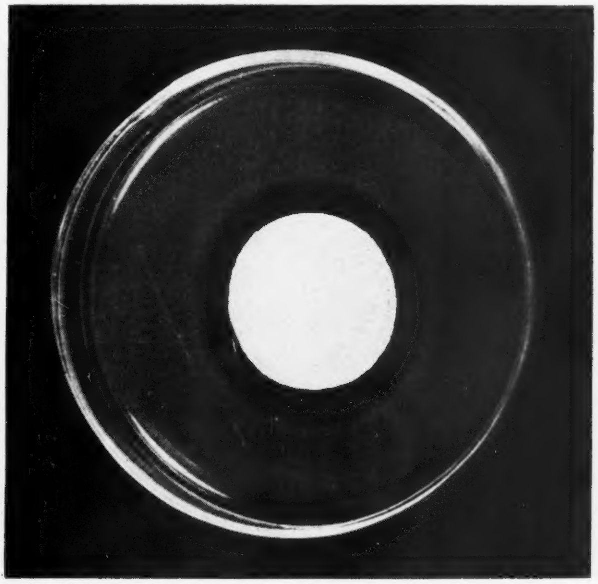
THE great majority of rubber chemists have heretofore never been required to include bacteriology in their work; consequently when antiseptics for use in rubber and latex compounds are presented to them, they are frankly at a loss to interpret the value of various materials offered them and to select the best product. They can, of course, readily evaluate the physical aspects of such products, for this falls within their range of knowledge and experience.

It may be well here to clarify the meaning of the terms used in relation to antisepsis. A germicide is an agent that kills germs or micro-organisms; while a bactericide is an agent that destroys bacteria, a group in the large world of micro-organisms. Thus, bactericide has a narrower meaning than germicide. A material that will destroy any and all forms of life—visible or invisible—is called a sterilizing agent. Sterilization, however, is sometimes used more loosely as in the case of the sterilization of milk, food, or water, where only the harmful bacteria are destroyed. A disinfectant is a germicide which is to be used only on inanimate objects. An antiseptic is intended for use on living tissues and must be either germ killing or germ inhibiting, depending upon the length of time it is to remain in contact with the body. Products such as mouth washes and gargles that come in contact with the body for short periods of time only, must de-

[1] Givaudan-Delawanna, Inc., 330 W. 42nd St., New York, N. Y.



This photograph of an agar plate using *Staphylococcus aureus* as the test organism demonstrates the lack of any antiseptic properties in rubber containing no added antiseptic agent.



This potograph shows agar plate test against *Staphylococcus aureus* of a piece of rubber containing 0.5% compound G-11. Note the clear zone of inhibition of three to five millimeters width which indicates that the growth of the test organism has been stopped. This rubber can be labeled antiseptic.

stroy bacteria in order to be properly labeled antiseptic. A product that involves longer periods of contact with the body, whether it is a medicinal ointment or a piece of rubber sheeting, if labeled antiseptic, must be such that it will inhibit or prevent the growth of micro-organisms.

The Food and Drug Administration has outlined test procedures for the determination of antisepsis. Those interested in this should procure circular No. 198, entitled "Methods of Testing Antiseptics and Disinfectants" by writing to the Superintendent of Documents, Washington, and enclosing ten cents. It will be seen that the standard test organism is *Staphylococcus aureus*, one of the resistant pus forming pathogenic organisms. The agar plate technique is utilized, and a clear zone of inhibition subsequent to the incubation at 37° C. for 24 hours is evidence of the antiseptic action. Actually this test measures the diffusability of the antiseptic producing chemical into the agar.

If a product satisfactorily passes this test the material can be properly labeled "antiseptic." It must be remembered that this does not mean, or should it be implied on the label or package, that the goods are sterile or that no micro-organisms can survive for shorter or longer periods on this item. Spores or other micro-organisms such as *Mycrobacterium tuberculosis* may remain viable and again grow when coming in contact with a favorable medium. Some may, therefore, question the value of an antiseptic in the first place since it might not kill all forms of micro-organisms. On second thought the fallacy of this reasoning becomes rather obvious.

Skin infections of varying degrees of severity are often the result of a minor cut or wound. Tuberculosis, for example, or various other infectious diseases are not contracted as the result of an infection in an open wound. The value of the antiseptic ointment used on a minor wound, therefore, is to prevent infection. A preparation that will stop the growth of the *Staphylococcus aureus* under the agar plate technique is therefore a very valuable and practical antiseptic.

Rubber goods that are antiseptic are useful particularly for hospital sheeting, dress shields, baby pants, elastic thread for girdles or other rubberized wearing apparel coming in direct contact with the skin. While such antiseptic rubber goods may not prevent infection, they at least cannot cause infection. A recent survey among a number of housewives revealed that nearly 75% of the women questioned considered antiseptic goods to be cleaner. They particularly liked the idea of antiseptic rubber goods for their babies' needs. This is a field that is entitled to some serious thought on the part of manufacturers of baby pants and other paraphernalia used on or about infants.

The introduction of a suitable antiseptic material in latex was not so simple as for milled goods. An investigation by Givaudan brought some very interesting facts to light. For example Thymol, either alone or with the use of various organic solvents, could not be suitably dispersed in a latex without causing precipitation of the latex. The sodium salt of Thymol was also found to destroy the stability of the latex.

A chlorinated dihydroxy diphenyl methane developed by the Givaudan laboratories and designated as Compound G-11 is one of the best materials for making products from dry rubber antiseptic. This chemical is insoluble in water and even its sodium salt is not of sufficient water solubility to enable its utilization in latex as a solution.

Considerable experimental work was done before a special solution of the sodium salt of the same chemical structure could be made which was freely soluble in one type of latex compound without any detrimental properties on the latex itself. When this was added to other types of latex compounds, however, different results were obtained. The latex was thickened, and considerable coagulation developed in a day or two. No investigation as to the cause of this variation was made.

The problem was then attacked from an entirely different angle. Since most users of any sizable quantity of latex do their own compounding, it was decided to try dispersing the G-11 with the other compounding materials, such as sulphur, zinc oxide, or other solids, and then adding the combination to the latex. It was found that the G-11 behaves just as these other solids do when compounded with the latex. No difficulties developed when this method of application was employed; therefore it is recommended as standard procedure for producing antisepsis in latex goods.

In practically all cases, both dry rubber and latex, 0.5% G-11 on the total dry weight of the compound was found to be effective in rendering the rubber definitely antiseptic.

A very important aspect of antiseptics for use in rubber is that they be non-irritating, non-toxic, odorless, nonvolatile, and water-insoluble in the rubber. Compound G-11 fulfills all these requirements, as has been repeatedly demonstrated under severe testing conditions. The tests for toxicity and skin irritation were carried out by a pathological laboratory utilizing rabbits and guinea pigs as experimental animals.

While other compounds are effective antiseptics per se, such as mercurial salts, their use is not favored because of the toxic nature of these compounds.

Latex Thickener No. 20

LATEX THICKENER NO. 20 is a complex ammonium salt, developed by Advance Solvents & Chemical Corp., 245 Fifth Ave., New York, N. Y., specifically for thickening latex and latex compounds. The material is in the form of a viscous light-amber liquid with an ammoniacal odor, a pH of 8.0 to 8.5, and a specific gravity of 1.08 at 66° F. To use, the thickener need only be stirred directly into the latex or latex compound in amount sufficient to produce the desired effect as determined by a preliminary trial. Its thickening action is illustrated in the case of one dipping compound where the film thickness was roughly doubled with each per cent. addition of thickener.

The mechanical stability of latex compounds is unimpaired by the use of Thickener No. 20, and simple blends of latex and the new material will stand for weeks without significant change in viscosity, it is claimed. Other points cited for the new product include: no effect on the drying rate other than that expected from increased film thickness; no significant decrease in film transparency when used in amounts up to 3% on the total latex; no effect on rate of cure; and no effect on the aging of films. The thickener is said to retard the settling of compounding ingredients, and its presence in the latex film facilitates the stripping of dipped goods from porcelain forms. In regard to water absorption, the following values were obtained on vulcanized films immersed in water for 48 hours: 0% thickener, 5.3% absorption and 5% thickener, 7.5% absorption. In addition to its thickening action, the new material is said to impart an appreciable heat sensitizing action to the compound, a property which makes it possible to coagulate the dipped or spread layer of latex immediately upon the application of heat.

Some Factors of Influence in Tear-Resistance Testing

I. C. Poules[1]

TWO separate studies were conducted on the tear test characteristics of rubber with the object of obtaining information which would aid in improving the accuracy and the speed of this test.

Care in Testing and Nature of Break

The object of the first investigation was primarily to determine if the wide variations in tear-resistance data resulting from test pieces taken from the same piece of stock were caused by carelessness either in the preparation or breaking of the test specimens. A further purpose was to ascertain if there was a tendency toward a particular type of break and if certain types of breaks produced high results while others gave low figures.

A series of test pieces were prepared from 45-, 60-, and 75-minute cures of a standard "tread type" compound containing 30 parts of carbon black and 20 parts of zinc oxide on 100 parts of selected smoked sheets. In testing, 24 test pieces of each cure were broken with and across the grain. Of each set of 24 pieces, 12 were prepared and placed in the grips of the test pieces with extreme care. On the other 12 specimens, no precautions were taken when preparing and placing the test pieces in the testing machine grips. Diagrams of test pieces showing the type of tear, together with test results, are presented in Figures 1, 2, and 3.

From an examination of the test data it was concluded that carefully prepared and tested specimens produce higher average tear-resistance data than are obtained when the work is done carelessly. However careless work does not cause wider variation than in the case where extreme care is exercised. Apparently in either instance there is no

[1] Manager, V. L. Smithers Laboratories, Akron, O.

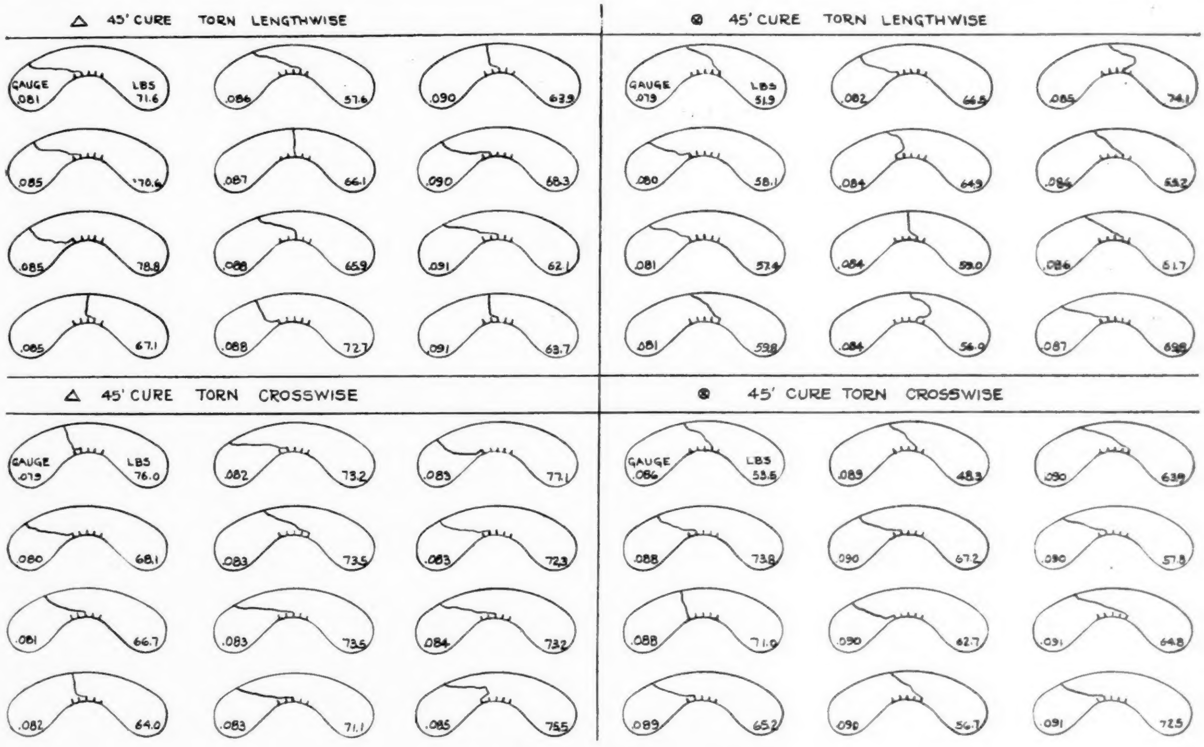


Fig. 1. Study of Tear Characteristics

△ **Test Pieces Prepared with Extreme Care**

⊗ **Test Pieces Prepared with Less Than Ordinary Care**

	LENGTHWISE With Care	LENGTHWISE Without Care		CROSSWISE With Care	CROSSWISE Without Care
Max.	78.8 lbs.	74.1 lbs.	Max.	77.1 lbs.	73.8 lbs.
Min.	57.6 lbs.	51.9 lbs.	Min.	64.0 lbs.	48.3 lbs.
Ave.	67.4 lbs.	61.2 lbs.	Ave.	71.5 lbs.	63.1 lbs.
% VARIATION FROM MAXIMUM			% VARIATION FROM MAXIMUM		
%	26.9	30.0	%	17.0	35.4

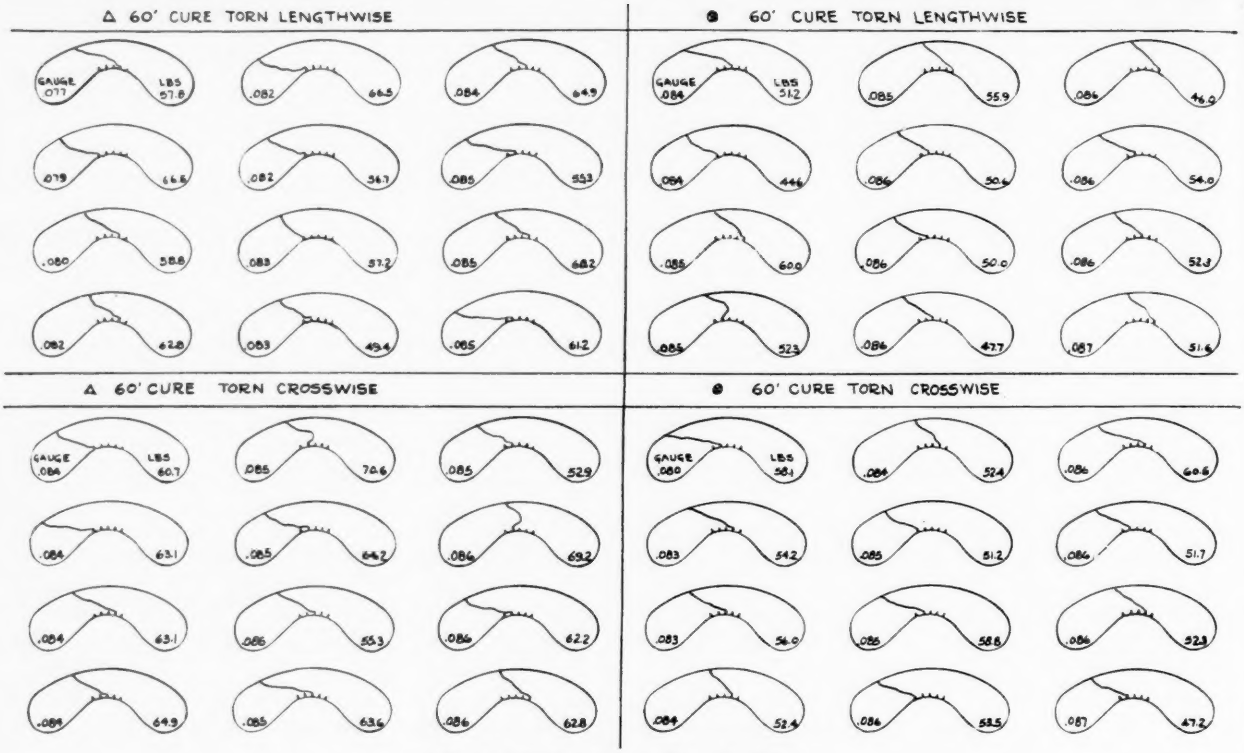


Fig. 2. Study of Tear Characteristics

△ **Test Pieces Prepared with Extreme Care** ⊗ **Test Pieces Prepared with Less Than Ordinary Care**

(for test results see opposite page)

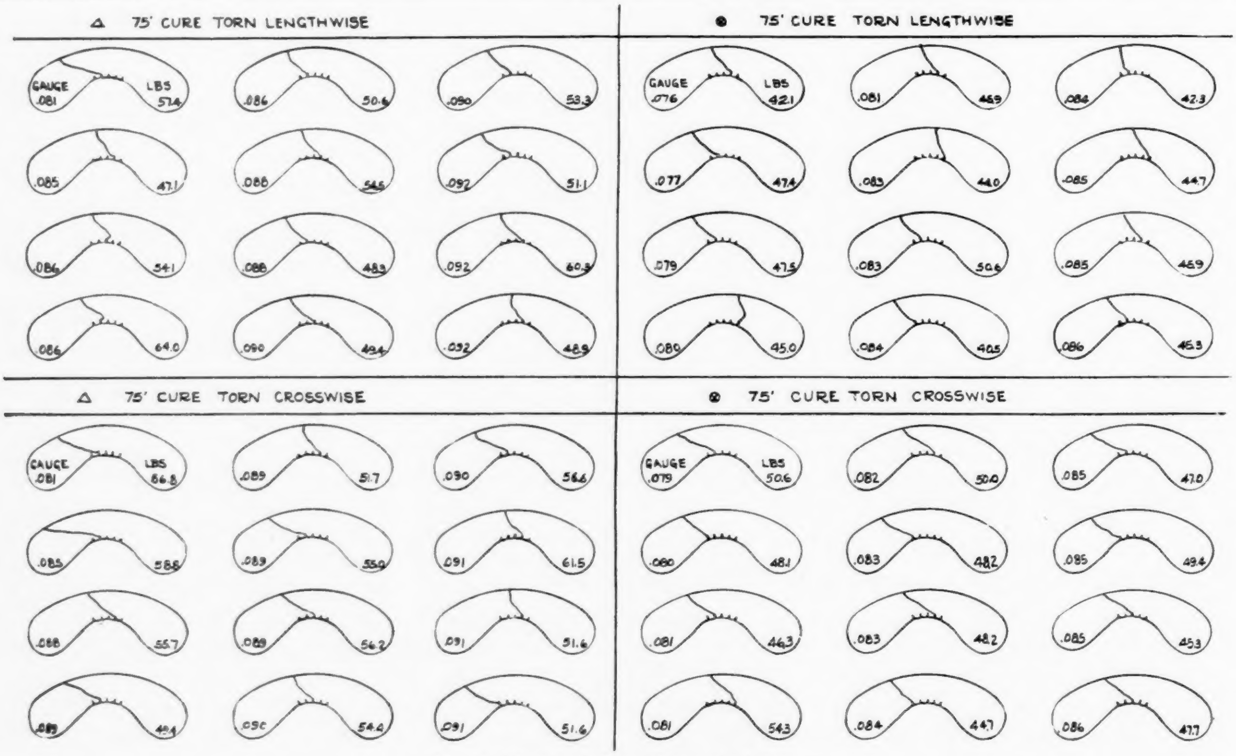


Fig. 3. Study of Tear Characteristics

△ **Test Pieces Prepared with Extreme Care** ⊗ **Test Pieces Prepared with Less Than Ordinary Care**

(for test results see opposite page)

Fig. 2
LENGTHWISE

	With Care	Without Care
Max.	68.2 lbs.	60.0 lbs.
Min.	49.4 lbs.	44.6 lbs.
Ave.	60.4 lbs.	51.4 lbs.
% VARIATION FROM MAXIMUM		
%	27.6	25.7

CROSSWISE

	With Care	Without Care
Max.	70.6 lbs.	60.5 lbs.
Min.	52.9 lbs.	47.2 lbs.
Ave.	62.7 lbs.	54.0 lbs.
% VARIATION FROM MAXIMUM		
%	25.1	22.0

Fig. 3
LENGTHWISE

	With Care	Without Care
Max.	64.0 lbs.	50.6 lbs.
Min.	47.1 lbs.	40.5 lbs.
Ave.	63.3 lbs.	45.2 lbs.
% VARIATION FROM MAXIMUM		
%	21.4	20.0

CROSSWISE

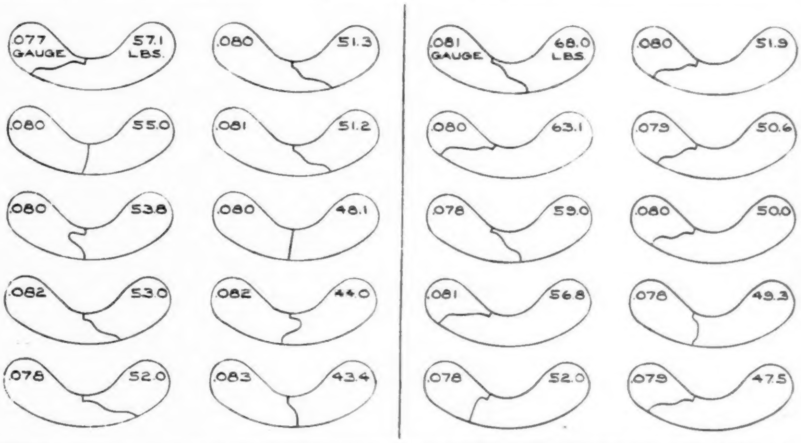
	With Care	Without Care
Max.	61.5 lbs.	54.3 lbs.
Min.	49.4 lbs.	44.7 lbs.
Ave.	54.9 lbs.	48.6 lbs.
% VARIATION FROM MAXIMUM		
%	19.7	17.7

Fig. 4. Tear Characteristics
One Cut—Center

High	57.1 lbs.
Low	43.4 lbs.
Ave. of All	50.9 lbs.
Ave. of 7 High	53.3 lbs.
VARIATION FROM MAX.—%	
All	24.0
7th High	10.5
Ave. of 7 High	6.6

One Cut—Side

High	68.0 lbs.
Low	47.5 lbs.
Ave. of All	54.8 lbs.
Ave. of 7 High	57.3 lbs.
VARIATION FROM MAX.—%	
All	30.0
7th High	25.4
Ave. of 7 High	15.6



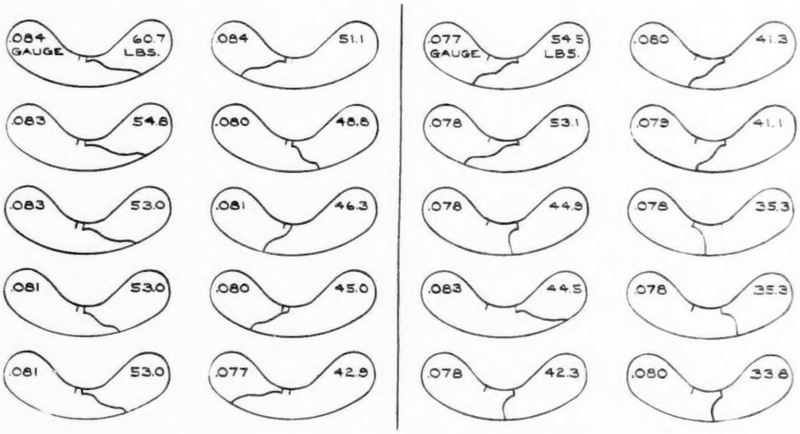


Fig. 5. Tear Characteristics
Two Cuts—Center

High	60.7 lbs.
Low	42.9 lbs.
Ave. of All	50.9 lbs.
Ave. of 7 High	53.5 lbs.
VARIATION FROM MAX.—%	
All	29.3
7th High	19.6
Ave. of 7 High	11.8

Two Cuts—One Each Side

High	54.5 lbs.
Low	33.8 lbs.
Ave. of All	42.6 lbs.
Ave. of 7 High	46.0 lbs.
VARIATION FROM MAX.—%	
All	37.9
7th High	24.5
Ave. of 7 High	15.5

tendency to produce a large number of breaks of one particular type, and the resistance to tear bears no relation to the path of separation or the point from which separation starts.

Number and Position of Cuts

The above study showed that the tear might start at any one of the five cuts in the test piece. This fact suggested an additional series of tests in which the specimens have one, two, three, four, and five cuts so placed that a comparison would be possible between the results obtained from tears starting at center cuts and tears starting at cuts nearer to the ends of the test pieces. From this study it was hoped that data might be obtained which would indicate whether or not it would be possible to eliminate some of the cuts and, if so, which ones.

For this series the standard A. S. T. M. compound was used, and sufficient slabs for the entire program were cured at optimum conditions. Tear test pieces were died out from these slabs, and the lot was thoroughly mixed for sampling. For each type of test, tears were made crosswise on ten samples. Figures 4, 5, 6, 7, and 8 show the results obtained.

An examination of the accompanying figures and results indicates that one cut at the center, (Figure 4) shows the minimum per cent. variation between test pieces prepared as described in the preceding paragraph. Test pieces having two and three cuts, but with one cut at the center also gave results with low per cent. variation between test pieces. However the most consistent results were obtained with test pieces having only one cut and that cut placed at the center. Moreover such a test piece

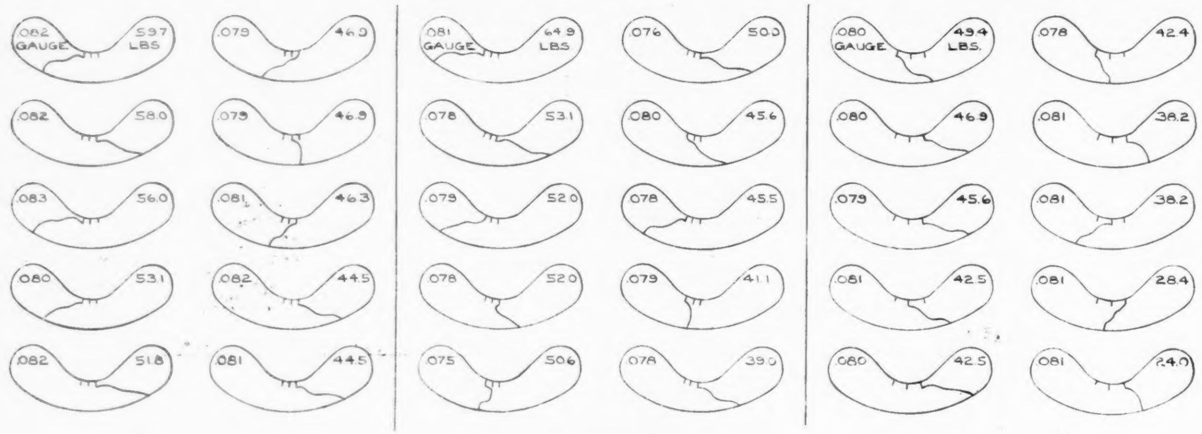


Fig. 6. Tear Characteristics

Three Cuts—Center

High	59.7 lbs.
Low	44.5 lbs.
Ave. of All	50.8 lbs.
Ave. of 7 High	53.2 lbs.

VARIATION FROM MAX.—%

All	25.4
7th High	21.3
Ave. of 7 High	11.0

Three Cuts—Side

High	64.9 lbs.
Low	39.0 lbs.
Ave. of All	49.4 lbs.
Ave. of 7 High	52.6 lbs.

VARIATION FROM MAX.—%

All	39.9
7th High	29.7
Ave. of 7 High	19.0

Three Cuts—Center and Sides

High	49.4 lbs.
Low	24.0 lbs.
Ave. of All	37.8 lbs.
Ave. of 7 High	43.9 lbs.

VARIATION FROM MAX.—%

All	51.8
7th High	22.7
Ave. of 7 High	11.1

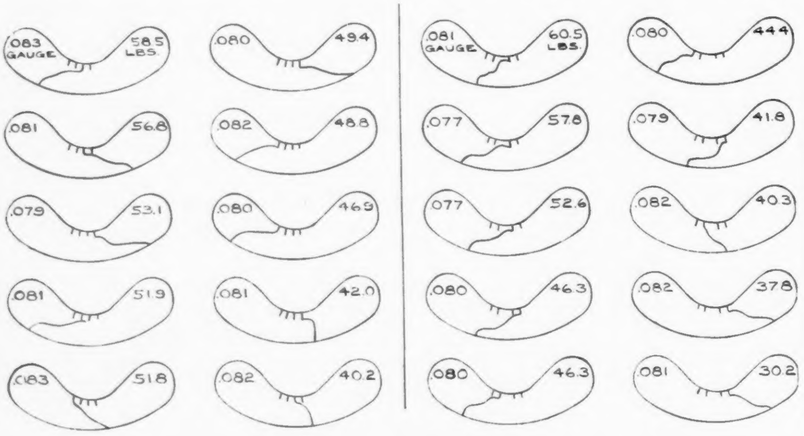


Fig. 7. Tear Characteristics

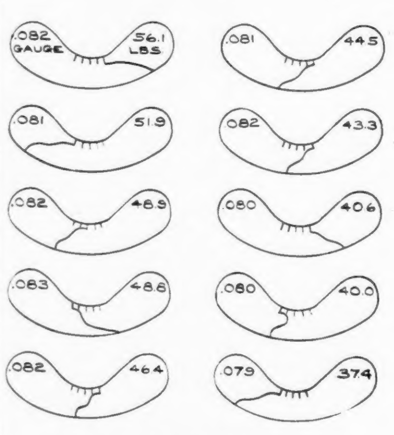


Fig. 8. Tear Characteristics

Four Cuts—Side

High	58.5 lbs.
Low	40.2 lbs.
Ave. of All	49.9 lbs.
Ave. of 7 High	52.6 lbs.

VARIATION FROM MAX.—%

All	31.2
7th High	16.5
Ave. of 7 High	10.2

Four Cuts—Two Each Side

High	60.5 lbs.
Low	30.2 lbs.
Ave. of All	45.8 lbs.
Ave. of 7 High	50.0 lbs.

VARIATION FROM MAX.—%

All	50.0
7th High	30.9
Ave. of 7 High	17.3

Five Cuts

High	56.1 lbs.
Low	37.4 lbs.
Ave. of All	45.8 lbs.
Ave. of 7 High	48.6 lbs.

VARIATION FROM MAX.—%

All	33.3
7th High	22.7
Ave. of 7 High	13.3

can be more easily and uniformly prepared.

Conclusions

The tests described above indicate that improved results can be obtained if great care is exercised when preparing the sample and placing it in the jaws of the testing machine and that one cut midway between the ends of the test piece gives more uniform results in repeat tests on the same stock than is the case if more cuts are made.

From Nicaragua comes a report that the Minister of Agriculture, José Maria Zelaya, upon the recommendation of three experts from the United States investigating the feasibility of growing rubber in Latin America, will establish two experimental stations on the Atlantic Coast to see if a good grade of rubber can be grown commercially. It is expected that the rubber experts will return to Nicaragua to organize the stations.

American Scrap Tire Resources[1]

Everett G. Holt[2]

THE location of factories engaged in processing scrap rubber for production of reclaimed rubber is mostly in the northeastern quarter of the United States. Ohio is by far the leading state, with New Jersey, Connecticut, Illinois, New York, Massachusetts, and California also of major importance, and with smaller production capacity in Pennsylvania, Colorado, Indiana, Alabama, Maryland, Maine, and Texas, according to available official data. Reclaiming plants usually draw supplies of scrap rubber from adjacent regions by truck and rail, although collections in coastal states are often moved by water transport to central dealers and reclaimers, and likewise to foreign markets.

In a national emergency calling for increased production of reclaimed rubber, larger collections of scrap rubber would be necessary, and it is therefore of interest to determine in what states additional supplies of scrap rubber would be expected to be most abundant and most easily collectible. Such data would also be helpful in selecting sites for expanding reclaiming facilities.

The rate at which tires and tubes are scrapped in the various states must have a reasonably close relation to total motor vehicle registrations, and motor fuel consumption in these areas. State data may therefore be expressed as percentages of the national totals for these two factors, and giving equal weight to the percentages for registrations and for motor fuel consumption assume the average of these to represent a fair estimate of the percentage of total tires and inner tubes scrapped annually in the different states.

The annual rate at which tires and inner tubes are worn out, nationally, has a relation to their national production rate, after allowing for exports and the lag of time equal to the average life of tires. Considering these factors, there is sound reason for believing that the weight of tires and tubes scrapped annually in the United States is at present from 700,000,000 to 1,000,000,000 pounds. Using the final percentage column in the table which follows, and adding four ciphers, the maximum annual potential gross weight of scrap rubber[3] for each state may therefore be arrived at.

New York is the leading state with an estimated 85,270,000 pounds a year, followed by California with 83,190,000 pounds, Pennsylvania 66,230,000, Illinois 62,140,000, and Ohio 61,050,000 pounds. Together these five states account for an estimated 35.8% of the annual potential scrap pile. The states with the least annual tire scrap are Nevada, Delaware, Wyoming, and Vermont, based on these percentages, and collectively these four states account for less than 1% of the national total each year. The following percentage table based on motor vehicle registrations and gasoline consumption during 1939 therefore furnishes an index of tire scrap annual availability by state areas.

TABLE 1. ESTIMATED PERCENTAGE BY STATES OF POTENTIAL ANNUAL SCRAP RUBBER COLLECTIONS

State	Motor-Vehicle Registrations %	Gasoline Consumption %*	Scrap Tires (Average) %
Alabama	1.063	1.065	1.064
Arizona	.429	.475	.452
Arkansas	.788	.802	.795
California	8.514	8.124	8.319
Colorado	1.121	1.049	1.085
Connecticut	1.505	1.551	1.528
Delaware	.222	.262	.242
District of Columbia	.538	.664	.601
Florida	1.475	1.605	1.540
Georgia	1.533	1.599	1.566
Idaho	.500	.446	.473
Illinois	6.042	6.386	6.214
Indiana	3.139	2.871	3.005
Iowa	2.501	2.429	2.465
Kansas	1.879	2.061	1.970
Kentucky	1.428	1.214	1.321
Louisiana	1.110	1.154	1.132
Maine	.656	.662	.659
Maryland	1.389	1.287	1.338
Massachusetts	2.848	3.180	3.014
Michigan	4.810	5.054	4.932
Minnesota	2.743	2.467	2.605
Mississippi	.798	.908	.853
Missouri	2.864	2.880	2.872
Montana	.590	.568	.579
Nebraska	1.329	1.071	1.200
Nevada	.133	.173	.153
New Hampshire	.429	.405	.417
New Jersey	3.357	3.745	3.551
New Mexico	.393	.451	.422
New York	8.675	8.379	8.527
North Caroline	1.871	1.899	1.880
North Dakota	.577	.575	.576
Ohio	6.164	6.046	6.105
Oklahoma	1.817	1.859	1.838
Oregon	1.206	1.084	1.145
Pennsylvania	6.711	6.535	6.623
Rhode Island	.572	.572	.572
South Carolina	1.028	.930	.979
South Dakota	.619	.603	.611
Tennessee	1.388	1.274	1.331
Texas	5.285	5.897	5.591
Utah	.435	.439	.437
Vermont	.296	.300	.298
Virginia	1.504	1.686	1.595
Washington	1.749	1.563	1.656
West Virginia	.935	.949	.942
Wisconsin	2.771	2.501	2.636
Wyoming	.271	.301	.286
Total	100.000	100.000	100.000

Owing to the widely differing sizes of states, however, the foregoing table does not clearly indicate the regions in which scrap tires occur in greatest density. This may be determined from a calculation showing average pounds per square mile of state area, or a calculation showing the average weight of scrap tires per linear mile of roads and streets for each state. The resulting table probably gives a better indication of the density and collectibility of scrap tires than the overall figures for state areas, although it must be borne in mind that such averages reflect, but fail to reveal fully the concentration in urban areas within each state.

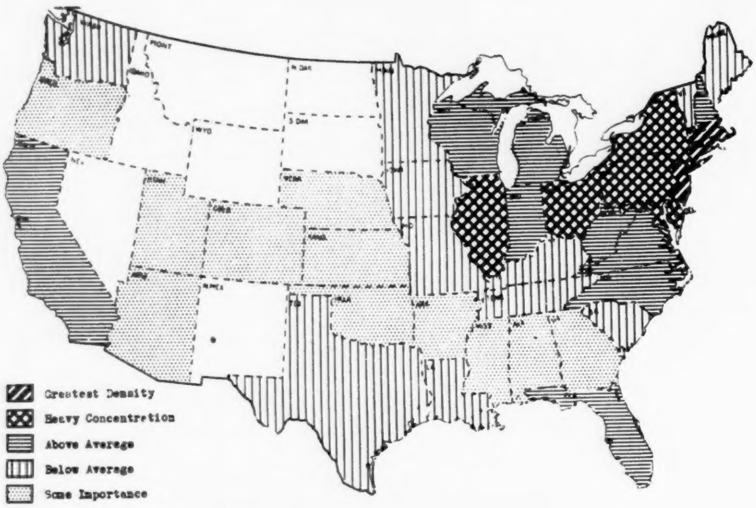
In Table 2 states are arranged in the order of importance of estimated annual availability of scrap tires and tubes, on the bases of 1,000,000,000 pounds for the national total. Other columns show the average density per square mile of area, and per linear mile of roads, and streets (including all types of roads for each state). In this table the District of Columbia is included two-thirds under Maryland and one-third under Virginia.

These data indicate that states where tire scrap becomes available in greatest density per road mile are Rhode Island, New Jersey, Massachusetts, and Connecticut—all industrial, small in area, and located in the northeast coastal section; together they account for only 8.7% of the national scrap. These states are followed by Maryland (D. C. two-thirds included), New York, California, Pennsylvania, Ohio, Delaware, Illinois, Michigan, and Florida—all but California and Florida being in the northeast quarter of the country, and all having over 400 pounds

[1] Reprinted from *Part 10—Rubber and Its Products* of Industrial Reference Service, Bureau of Foreign and Domestic Commerce, Washington, D. C., No. 9, Jan., 1941.

[2] Chief, Leather and Rubber Division.

[3] EDITOR'S NOTE: As the percentage column totals 100, this method of computation is based on one billion pounds per year and disregard for the decimal point when adding four ciphers to indicate pounds of scrap by states. On the basis of most recent estimates that 618,349 long tons of crude rubber were consumed in the United States during 1940 and that during the first nine months of 1940 the tire division used 77% of the crude rubber, approximately one billion pounds of crude rubber went into tires and allied products in 1940.



Bureau of Foreign and Domestic Commerce

Potential Annual Scrap Tire Resources

of scrap available per mile of highways and streets annually; collectively these states account for 44.2% of the national scrap.

Virginia (D.C. one-third included), New Hampshire, Indiana, *Washington,* and Wisconsin follow, with over 300 pounds per road mile (9.5% of the scrap), followed by *Maine, North Carolina, Oregon, Texas,* West Virginia, and *Louisiana,* with over 250 pounds (11.3%), and by *Arizona,* Missouri, Kentucky, *Iowa,* Vermont, *South Carolina,* and *Minnesota* with over 200 pounds (11%). States italicized are those in which actual collections could probably be greatly increased above the current rate.

Table 2. Density of Scrap Rubber Resources, by States

State	Estimated Annual Scrap Pounds	Average Density (Lbs.) per— Square Mile	Road Mile
New York	85,270,000	1,779	834
California	83,190,000	534	708
Pennsylvania	66,230,000	1,478	596
Illinois	62,140,000	1,107	508
Ohio	61,050,000	1,500	591
Texas	55,910,000	213	273
Michigan	49,320,000	858	466
New Jersey	35,510,000	4,730	1,331
Massachusetts	30,140,000	3,750	1,130
Indiana	30,050,000	834	340
Missouri	28,720,000	418	220
Wisconsin	26,360,000	477	309
Minnesota	26,050,000	322	210
Iowa	24,650,000	444	216
Kansas	19,700,000	241	145
North Carolina	18,800,000	386	291
Oklahoma	18,380,000	265	171
Virginia	17,950,000	446	351
Maryland	17,390,000	1,742	925
Washington	16,560,000	248	328
Georgia	15,660,000	267	151
Florida	15,400,000	281	416
Connecticut	15,280,000	3,170	1,042
Tennessee	13,310,000	320	197
Kentucky	13,210,000	329	217
Nebraska	12,000,000	156	114
Oregon	11,450,000	120	288
Louisiana	11,320,000	250	266
Colorado	10,850,000	105	138
Alabama	10,640,000	207	162
South Carolina	9,790,000	321	212
West Virginia	9,420,000	392	271
Mississippi	8,530,000	184	131
Arkansas	7,950,000	151	135
Maine	6,590,000	221	292
South Dakota	6,110,000	80	60
Montana	5,790,000	40	86
North Dakota	5,760,000	82	52
Rhode Island	5,720,000	5,360	1,494
Idaho	4,730,000	57	159
Arizona	4,520,000	40	227
Utah	4,370,000	53	198
New Mexico	4,220,000	35	72
New Hampshire	4,170,000	462	341
Vermont	2,980,000	327	212
Wyoming	2,860,000	29	120
Delaware	2,420,000	1,230	552
Nevada	1,530,000	14	69
	1,000,000,000	336	326

The remaining states account for only 15.2% of the total, and annual collections could be expected to average less than 200 pounds per mile of road through these states, the most important of which (in order to total scrap available) are Kansas, Oklahoma, Georgia, Tennessee, Nebraska, Colorado, and Alabama. Reclaimers in Colorado and Alabama are known to use much local scrap so that even in these areas collections are substantial.

The average density of scrap per square mile for the nation is estimated at 336 pounds and the average density per road mile at 326 pounds. Table 2 shows density per road mile in the four leading states to be three to four times the average, in the next seven states 1½ to three times average, in the next seven states above average, and in the remaining states less than average. Density per square mile in the four leading states is about ten times average and in the next six, density per square mile is three to five times the national average. California, Florida, Washington, and Maine rank much higher in density per road mile than in density per square mile, a peculiar agreement among the four corner states.

The map included in this report indicates the relative density of annual scrap tire resources, equal weight being given here to the state data per road mile and per square mile.

The purpose of this circular is to indicate the relative annual availability and collectibility of scrap tires in the various states. The actual amount of scrap rubber available in each state at present cannot be calculated from available data; this would depend on the unknown extent of past collections and local destruction of scrap. It is believed that full collections of accumulated scrap would show the existence of large accumulations even in states where collection is customary; while in other states, accumulations might in some cases greatly exceed the annual potential scrappage.

Smooth Tire Treads on Snow and Ice. Results of 3,000 tests on packed snow and icy surfaces, made in Michigan, show that, although tires having good treads are preferred to smooth tires on dry and wet roads, they give no better performance than smooth tires on snow and ice. *Highway Research Abstracts,* November, 1940.

Semi-Conducting Rubber and Synthetic Rubber Compounds

A. E. Juve[1]

PHENOMENA associated with the accumulation and discharge of static charges are experienced by everyone. Aside from lightning, the most common experiences are probably the evidences of static charges in combing one's hair, scuffing of the feet on a dry carpet, separating two sheets of paper, and many similar occurrences. These phenomena are usually unobjectionable though they may be a nuisance and often extremely uncomfortable. In many cases, however, particularly in industry, the discharge of a static accumulation in the presence of inflammable solvents or dust mixtures can be extremely hazardous.

Static charges may be developed in a variety of ways. Primarily, friction between two insulating materials or within an insulating liquid or gas is required. Static charges may also be developed in the absence of friction as when a liquid is broken up into small particles or a mist, or when a mist coalesces into larger particles.

An article, when charged, may be discharged by grounding to the earth with a conductor or by contact with a body of opposite charge. In both cases the discharge, if the potential is sufficiently high, is accompanied by a spark. Its charge may also leak off slowly to the ground through air which is humid. The higher the humidity, the faster the rate of discharge. It has been reported that static-generated fires in rubber coating plants are practically unknown at humidities exceeding 50%. Moderately good conductors, which are in turn grounded, may also be used to bleed off an accumulated charge without the violence and spark that would accompany a very low resistance discharge.

In many rubber applications problems concerned with the generation and dissipation of static charges are important. Since normally compounded rubber is an excellent insulator, rubber products, which in service are subjected to frictional forces applied through or by another insulating material, will accumulate static charges.

This "industrial bogeyman" is especially active in factories which use belting, in the oil and aviation industries, hospital operating rooms, and filling stations.

In factories the uncontrolled discharge of static accumulations built up in belts, especially those operating on insulated pulleys, is blamed for an estimated annual fire loss of $3,000,000, according to the National Fire Protection Association.

In aviation the natural flow of air across the body of a plane in flight creates a charge which, if it were not controlled, would reduce the efficiency of de-icing equipment; while the same applies to airplane tires.

The turbulent flow of gasoline through hose in loading and delivery operations of the oil industry also creates an obvious danger; while filling stations face a static hazard because automobile bodies become charged in the same way as planes. In this instance the discharge would be particularly hazardous, but for various elementary protective measures adopted widely.

The rubber industry itself faced the same problem because rubber tires which are naturally non-conductive prevented the dissipation of static accumulated in the body of an automobile and on the tires, but this also has largely been solved as explained in the recent bulletin issued by the Rubber Manufacturers Association, Inc.[2]

In some applications the accumulation of static charges is not hazardous; in others satisfactory grounding connections can be readily applied so that no hazard results. However in a number of other applications it is necessary for the successful performance of the article that the rubber composition provide a path for the discharge of static. The successful development of applications in this category is dependent upon the ability of the rubber technologist to provide compositions of various degrees of conductivity to bleed off static charges at a rate sufficiently high to prevent their accumulation to the danger point. In addition to their function as a moderately good conductor, these compounds because of their higher conductivity will generate less static voltage under the same frictional conditions.

Some of these applications in which conductive rubber are already being utilized are the following:

(a) V-belts for washing machines utilizing a conducting cover which prevents a difference in potential between the motor and the washer from building up.

(b) Treads for airplane tires which on landing provide a path for the grounding of the charge accumulated on the plane during flight.

(c) Conducting surface on Goodrich de-icer to bleed off to the metal wing structure, the static generated during flight, thus preventing a discharge which might puncture the air tubes of the de-icer and reduce its efficiency.

(d) Gasoline hose nozzles of conducting synthetic rubber to discharge static existing on cars when they come into the station, as well as the charges generated by the turbulent flow of gasoline.

(e) Rubber products such as mats, heels and soles, sheeting, anesthesia tubing, masks, etc., in hospital operating rooms to eliminate the danger of static discharges igniting anesthetics.

The specific resistivity of rubber and synthetic compounds can be varied within wide limits of compounding. The resistivity of an unloaded rubber compound is 10^{15} ohms/cm^3, or higher, depending upon the freedom of the compound from non-rubber materials. The synthetics, neoprene, Perbunan, "Thiokol", and Ameripol (Hycar O.R.) in unloaded compounds show a much lower resistivity, possibly as low as one-millionth the resistivity of rubber.

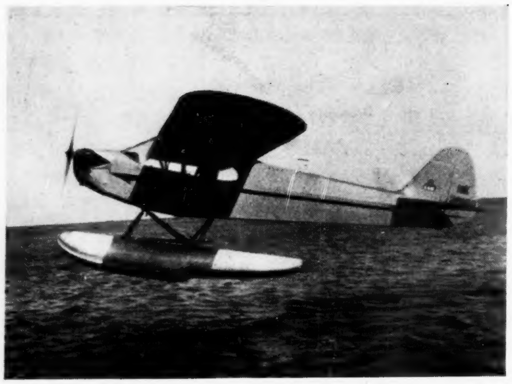
By the addition of various pigments developed especially for their conducting properties the resistance of both rubber and the synthetics can be greatly decreased. Starting with the more lightly loaded stocks, the synthetics are much better conductors than similarly loaded natural rubber stocks. However, when the loading reaches 60 to 80 parts of pigments per 100 of the rubber or synthetic, the conductivities are about equal. The maximum conductivity is obtained with the maximum loading, which, of course, results in stocks which are very hard and inelastic. With stocks of this type, resistances in the range of 1-10 ohms/cm^3 can be obtained. Stocks of excellent quality having a resistance in the range of 100-500 ohms/cm^3 in the hardness range of 70-75 Dur. are readily obtainable.

In measuring the resistance of rubber articles the fol-

(*Continued on page* 50)

[1] Technical Department, Mechanical Division, B. F. Goodrich Co., Akron, O.
[2] See page 49.

McKinley Pneumatic Floats for Seaplanes



Seaplane Equipped with McKinley Pneumatic Floats

McKINLEY pneumatic floats, model PF-2, developed at the suggestion of Captain Ashley C. McKinley, of the Babylon Seaplane Base, Babylon, L. I., have been granted an Approved Type Certificate, No. 126, by the Civil Aeronautics Authority. The Goodyear Tire & Rubber Co., Akron, O., will manufacture McKinley pneumatic floats under CAA Production Certificate No. 37.

Model PF-2 was designed and approved for planes grossing 1,475 pounds. Because of lightness in weight, it is practical to install them on craft as light as 1,000 pounds, providing surplus buoyancy free of the usual accompanying penalty of forced reducing of payload.

Together McKinley Pneumatic Floats, Inc., and the Goodyear company have spent 18 months in refining design and flight testing in the accumulation of engineering data, since the pneumatic principle was first demonstrated in flight in June, 1938. A float with greater displacement than is actually necessary for the lightest type of popular priced planes was selected by the designers so that certain applied pneumatic principles could be then projected and made adaptable to larger floats and other flotation gear.

Model PF-2 is 12 feet, 9 inches in length and 22⅝ inches in diameter at point of maximum girth. The weight is only 42¼ pounds each. The material used is standard airship fabric of the type used in Navy and Army non-rigid airships. The rubberized fabric, which is of three-ply construction, weighs approximately 1¼ pounds per square yard, and has high tensile strength and tear resistance and low diffusion. It has a strength of 190 pounds in the warp and 160 pounds in the filler. The cement used in junctions is of equal or greater strength than the fabric.

The step is tailored into the fabric. A distinctive feature of construction consists of the spray tubes which extend from the nose of each float to the step. These tubes, held in place by cement, divert the water in taxiing up to take-off speed, and also they conduct a stream of air on the underside of the tube which aids in breaking the water seal.

Each float is divided into five compartments, but in place of rigid bulkheads separating the compartments, a fabric diaphragm is used assuring equable pressure throughout the hull. Four compartments are about equal in size, except as the floats taper. The fifth compartment, in the nose, also serves as a pneumatic bumper.

The only rigid member in McKinley pneumatic floats is a V-beam for attachment of the struts and providing a walk. This beam is of punched duralumin, anodized and treated with zinc chromate. Hermetically sealed, it is impervious to corrosion.

Aside from its greater lightness the major advantage claimed for the pneumatic principle is its shock-absorption qualities, most noticeable when taking-off and landing in heavy seas. Not only does this feature assure minimum stress and strain to all fittings of the plane, but other demonstrated superiorities are improved air-flow characteristics, minimizing drag, and incomparable economy in maintenance costs.

In experiments extending over three hundred hours of service operations, deliberate collisions were made with driftwood, buoys, and other objects at taxiing and take-off speeds. Resiliency was proved as in every instance the floats caromed harmlessly away. Incisions made in the fabric, to establish that the diaphragm principle would take up the air space of any one deflated compartment, revealed that such damage may be repaired as easily as an inner tube is patched and without the necessity of removing the floats from the plane. Obviously there are no rivets to work loose or plates to spring, and with the pressure applied internally there can be no leakage, resulting in undue heaviness in take-offs or landings because of water leaking inside the hulls.

Maximum and minimum pressures for model PF-2 range from three pounds to one pound. Excellent efficiency for normal operation is found at a pound and a half pressure.

By reason of their surplus buoyancy and rounded characteristics full surface navigational control under minimum wind conditions is achieved by the aircraft rudder alone. It is believed that water rudders will not be necessary. As speed increases, the floats are so designed to change shape until a planing surface is formed by reason of water pressure. Once in the air, internal pressure restores the rounded bottoms.

In addition to the usual engineering and static tests conducted on Wingfoot Lake, Akron, an unusual drop test was performed for observers from the United States Navy and the Civil Aeronautics Authority. Loaded with 1,160 pounds' deadweight, the floats were first dropped vertically from a height of 18 inches, then with the same loading dropped from a canted angle where the full shock of impact was taken on a single float. Inspection revealed that the floats had fully absorbed the energy attending without damage. In more recent tests for the Civil Aeronautics Authority a Piper Cub J-3, 50-h.p. Continental, with full load, was repeatedly taken off and landed on the ice at Babylon Seaplane Base test basin.

U. S. Service Stations Up

The 1939 Census of Distribution revealed in a preliminary report that in 1939 the number of service stations in the United States rose to 241,856. Texas had the most, 15,738; followed by New York with 15,652; California, 15,218; Pennsylvania, 14,031; Ohio, 12,800; Illinois, 12,096; and Michigan, 10,941; with other states having less than 10,000. Service stations, by Census definition, include only those retail businesses in which the sale of gasoline and oil totals at least 50% of dollar sales.

Static Electricity as Related to Automobiles and Tires[1]

STATIC electricity is known to be developed by friction between moving parts. Large static electric charges can be built up and retained if one or more of these moving parts is a good electrical insulator. The rubber compounds and cord fabric of which tires are made are inherently good electrical insulators. Hence, if a static charge is somehow built up on the frame or body of an automobile, the tires will generally serve to insulate the automobile from ground, preventing the charge from flowing to the road surface as it is developed by friction. Tires, therefore, should not be held entirely responsible for undesirable static electricity, for they merely prevent dissipation of charge which is often caused by other factors. The problem is most logically and easily solved by finding a means of dissipating the charge and thus preventing the build-up of large undesirable static voltages.

Effects of Static Electricity

There are two types of difficulties resulting from static electricity in automobiles:

A: Radio interference
B: Electrostatic shock

Radio interference from static electricity occurs when there is an irregular discharge of electricity between various parts of the automobile. If radio interference continues when the car and motor are stopped, the trouble is not caused by static electricity generated in the automobile.

Electrostatic shocks occur when the generated static electricity accumulates on the car and is not discharged until someone touches the car, grounding it through his body.

Contributing Factors

Factors influencing static electricity in automobiles are road surfaces, atmospheric conditions, clothing and car upholstery and moving parts of the car. For example, asphalt roads are generally very good insulators and will amplify an electrostatic difficulty. This is particularly true in regard to the problem of shocks. Static is generated and retained to a higher degree where the absolute humidity is low. Very little trouble of this kind is experienced in warm, moist, climates or in regions where frequent precipitation keeps the roads slightly damp. Friction of clothing on upholstery may contribute to the severity of electro-static shocks, but constitutes a very difficult factor to control. Air friction on car body also is a contributing cause.

Each static complaint constitutes an individual problem which must be analyzed and handled according to the particular factor or group of factors found to be causing the trouble. Although there appears to be no specific preventive of static generation at the present time, the following suggestions have been successful in eliminating or greatly reducing the troublesome effects of static electricity on cars.

[1] Prepared by The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y.

Elimination of Radio Static and Electrostatic Shock

The following procedure will invariably correct any case of either shock or radio interference static where the cause is due to generation of static electricity from friction of the moving parts of the car:

1. Dismount all tires and tubes, removing tubes from the tires.
2. Thoroughly clean inside of tires with naphtha or high-test gasoline, removing all dirt and excessive soapstone. Also clean outside sidewalls of each tire from the toe of the bead up to the edge of the tread.
3. Thoroughly clean inside of rim flanges and rim ledges where the beads of the tire contact the rim, removing all paint, dirt, and rust, with a wire brush and gasoline until the metal is bright.
4. Apply a conducting paint on the sidewalls and beads of the tires. For white sidewall tires, apply the paint on one sidewall only (the one next to the chassis). This paint can be easily made by mixing a solution of powdered graphite, naphtha or high-test gasoline, and a small quantity of cold patching cement to the consistency of thin paint and applying with a paint brush. Stir solution occasionally when applying to keep ingredients well mixed. The proportions are: 1 pint naphtha; 8 ounces powdered graphite; 1½ ounce patching cement. *Do not* use *flake* graphite or *vulcanizing* cement.
5. Paint the rim flanges, and ledges where the beads contact, in the same manner.
6. Do not paint the tubes, or the insides of the casings, or allow the paint to get on the inside of the casings.
7. Allow the paint to dry thoroughly and remount all tires. Be sure that any tacks, nails, bits of metal, etc., which may aggravate the effects of static electricity have been removed from the tires.
8. Install the wheels on the car so that the wheel positions of the fronts and rears are interchanged to change direction of rotation of tires.

This effective method "grounds" the car and provides a path to earth for any electrostatic charge which has been built up on the car, thereby preventing its annoying effects. It may be necessary in rare cases to repeat the process should the trouble reappear.

9. Install static collectors in the front hubs and against the rear brake drum backing plates, or adjust collectors already in place.
10. Ground all parts of body and motor to the frame (except where insulated top is used for the antenna). Make certain that antenna leads are well insulated and are not near moving parts.
11. Insulate all high potential ignition leads from other metal parts of the car. A grounded metal shielding tube over the ignition cable will generally cut down interference from that source.

Static Complaints from Causes Other Than Tires

Following are reports of typical actual cases investi-

gated which verify the fact that other factors must be checked in such complaints in addition to the tires.

Case No. 1—Shock and Radio Interference

New Convertible Coupe driven only 313 miles with a bad case of radio interference and static shock. Had been worked on by several technicians, but no improvement effected. Case was then referred to a tire service representative on the assumption that the tires were the cause of the static. His report follows:

"Tires and tubes were dismounted and all soapstone removed from tubes and casings. Tires were then remounted and placed in different wheel positions than previously. Little, if any improvement was effected. We then put the car on a hoist and in checking the antenna and connections found the wire which connects both antennaes was lying on the driveshaft and had worn off all the paint. This was fastened in place properly, the car again tried and showed a big improvement.

"We continued to check and found one of the supposedly permanent soldered connections not soldered. This was fixed and again an improvement in the radio.

"We then got the idea that a large part of the static was coming from the cloth top due to the air friction, and inasmuch as the body is somewhat insulated from the frame, this static build-up had no way of discharging until someone touched the car. We then soldered a piece of flexible copper tape from the body of the frame (one or each side). This cut the charge about 50%. We then soldered on two more—one on each side and completely eliminated all static."

Case No. 2—Radio Interference

". . . Sedan, late model, equipped with ...... tires. Road tests proved that static was not due to tires. It was finally discovered that static was built up in right front fender and was picked up in aerial under right running board. It was found by means of a long screwdriver that the fender apron was not properly grounded to the frame. A metal strap was used to ground the fender apron to the frame. Car was then road tested and radio worked O.K."

Care of Rubber Flooring[1]

THE correct care of rubber flooring is most important if it is to give good service and maintain its resiliency and attractive appearance. Experience has shown that ordinary cleaning methods are not always applicable to rubber flooring. Soft soaps, soaps containing essential oils, e.g., turpentine or pine oil, and pastes or powders containing coarse abrasives should not be used for cleaning rubber flooring. Petrol, benzine, naphtha, paraffin, and similar solvents must not be used as they attack the rubber, causing it to become soft and sticky, while the "bleeding" of colors may also take place. These solvents may, however, be employed for the removal of grease and tar stains if quickly wiped off.

Before washing the rubber floor, the loose dirt should be brushed away and the floor washed in small sections, using a cloth or mop in preference to a scrubbing brush. Whether cold or warm water is used will largely depend upon the cleanser employed. The water should be changed frequently, and preferably the dirty water from the cloth or mop should be wrung into a separate pail. The washing cloth should be rinsed in clean water before application to the floor, but in no instance should an excessive amount of water be used, as this might creep between the joints of the flooring and in due time affect the adhesion of the rubber to sub-floor. The floor should be dried as completely as possible as this action improves the sheen, every care being taken to remove any residue left by the cleansing material. It cannot be too strongly emphasized that every endeavor must be made to insure that the cleanser is being applied in accordance with instructions supplied by the manufacturers.

Great care should be taken in the choice of polish. Polishes containing organic solvents are detrimental to rubber, although they may be quite satisfactory for other floor coverings. A wax emulsion polish should, therefore, be used for rubber flooring.

Before applying the polish, the surface should be thoroughly clean, dry, and free from oil or grease. The polishing operation should be conducted in sections so that the traffic is not suspended while the sections are drying, which occupies from five to thirty minutes, depending upon the atmospheric conditions and the polish employed. The polish should be spread lightly and evenly over the surface with a clean pad of cotton or similar material. It is important not to rub the wax into the flooring. A second application can be made, but some little time, say an hour, should elapse between applications. Burnishing or polishing, either by hand or machine, will create a surface with high luster and hard-wearing qualities.

When the polished floor becomes dirty, the loose dirt should be removed with a broom and the floor wiped with a cloth moistened with clean cold water. No cleanser should be used as this will remove the polish. When renewal of polish is necessary, the old polish can be removed with a strong solution of cleanser in hot water, followed by the procedure given above for washing.

[1] Abstracted from a bulletin on "The Care and Treatment of Rubber Flooring", issued by The British Rubber Publicity Association, 19 Fenchurch St., London, E.C.3, England.

Semi-Conducting Rubber

(*Continued from page* 47)

lowing factors are of importance:

(a) Adequate contacts must be provided, especially on the more conducting stocks; otherwise the contact resistance may be more than that of the stock itself.

(b) Flexing or stretching of the rubber increases its resistance considerably. To obtain comparable results, the same flexing treatment should be given all the specimens before the electrical test. After flexing, the conductivity recovers to nearly its original value, the rate and amount of recovery depending upon the vigor of the flexing.

(c) Variation of current density over wide limits does not affect the resistivity of rubber and most synthetic compounds of resistivity below 10^6 ohms/cm^3, so long as the current does not appreciably heat the specimen. Contact resistance, which is large compared to the actual resistance of the specimen, will decrease as the test voltage is increased.

The development of semi-conducting rubber and synthetic rubber compounds has been the means of solving a number of important problems involving hazards due to static discharges. Undoubtedly the availability of these materials will now be the means of solving many more.

The Creep of Natural and Synthetic Rubber Compounds in Shear[1]

Stuart H. Hahn[2] and Ivan Gazdik[2]

CREEP, or the change of deflection of a material under constant stress, is a phenomenon exhibited in varying degree by all solids. Numerous investigators have reported data for the creep of marble, rayon and cotton, plastics, and other substances. The creep of metals has been studied extensively because it often is the limiting factor in their use, particularly in modern high temperature power-plant equipment and in the springs of precision instruments.

The use of rubber as a structural material is rather recent, and consequently published information regarding creep of rubber is limited. Some data on creep of rubber stressed in tension were given in papers by C. F. Hirshfeld and E. H. Piron,[3] and by M. L. Braun.[4] Compression data were included in papers by E. H. Hull[5] and R. W. Brown;[6] shear creep curves were presented by Hirshfeld and Piron[3] and by F. L. Haushalter;[7] shear data in Torsilastic springs were discussed by Krotz[8] and by Haushalter.[7] Service data from actual installations of tubular (axial shear) mountings were included in a paper by Hahn.[9] These references are of some help to the design engineer, but they do not always give complete information regarding test conditions and specimen dimensions.

The increasing use of rubber stressed in shear as a springing medium makes it important that design engineers have some idea of the creep that may be expected from properly prepared rubber compounds. This paper presents some typical creep data for compounds of natural and synthetic rubbers—including a polychloroprene (Neoprene E) and a butadiene copolymer. These results were obtained during a study of the creep of a wide range of compounds stressed in shear for periods of time up to nearly 1,000 days under controlled conditions approximating those of actual service.

Test Procedure

Two views of a part of the creep testing equipment are shown diagrammatically in Figure 1. The test specimens are rubber shear mountings consisting of rubber bonded to two parallel flat metal plates. Nominal rubber thickness is $\frac{5}{16}$-inch with a 3- by 4-inch adhesion (shear-stressed) area. The mountings to be tested are attached to each other, end to end, with spacers so that vertical displacement of the end mountings results in a nearly pure shear strain in the rubber. The free plate of the top mounting in each line is attached rigidly to a testing frame.

The mountings are loaded by applying the compressive force of a standard automobile helical suspension spring through the connection shown in Figure 1 to the free plate of the bottom mounting so that shear load of the mountings in series is balanced against the compression of the helical spring. Weight of the mountings themselves produces a negligible stress variation from bottom to top of the line. The desired load is maintained on the mountings by frequent adjustments of the helical spring to its previously calibrated height. By this arrangement, up to ten 3- by 4-inch mountings can be tested in one line, and a maximum of 70 mountings can be tested simultaneously in one frame. Specimens of various sizes can be tested simultaneously at various shear stresses with this equipment.

One frame is surrounded by a large forced-convection oven to maintain the mountings at a temperature of 140° F., usually to ± 1.5° F., for an accelerated test; while another frame is located in a room with temperature controlled at 80° F. for normal temperature tests.

The compact arrangement of mountings permits the

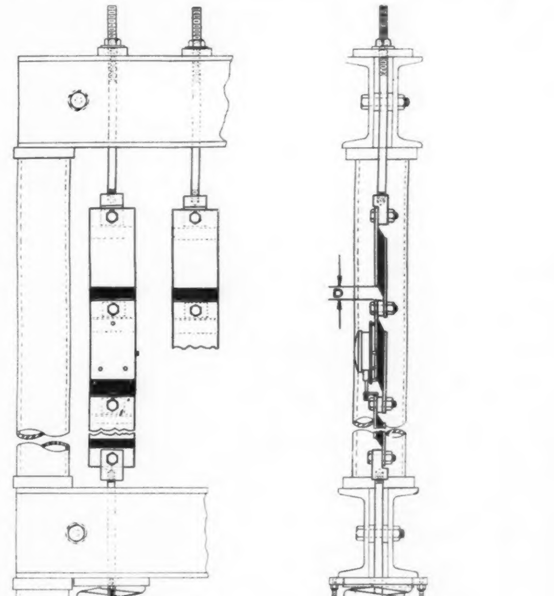


Fig. 1. Shear Mounting Creep Test Apparatus (The B. F. Goodrich Co.)

[1] Presented before the Subdivision on Rubber and Plastics of the Process Industries Division, American Society of Mechanical Engineers, at the annual meeting, New York, N. Y., Dec. 2-6, 1940.
[2] Physical Research Laboratory, B. F. Goodrich Co., Akron, O.
[3] *Trans. Am. Soc. Mech. Engrs.*, 59 (1937).
[4] *Physics*, 17, 11, 421 (1936).
[5] *J. Applied Mechanics*, 4, 3, A-109 (1937).
[6] *S. A. E. Journal*, (Trans.), 47, 4 (1940).
[7] *Trans. Am. Soc. Mech. Engrs.*, 61, 2 (1939); *S. A. E. Journal*, 44, 15 (1939).
[8] *Rubber Age* (*N. Y.*), 45, 149 (1939).
[9] *Product Eng.*, Feb.-Mar., 1937.

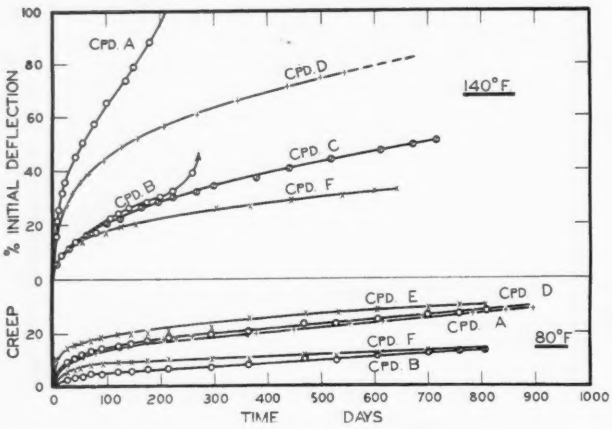


Fig. 2. Creep Curves of Shear Mountings

CPD. A, B, C Rubber **50 Psi** **CPD. D—N, E, F Butadiene Copolymer**

maintenance of uniform temperature distribution in the oven. The spring loading system is advantageous in eliminating awkward and bulky dead weights and in minimizing the effects of stress variations in test mountings which would be caused by vibrations of the building.

Creep measurements are made by determining the distance D, in Figure 1 between the ends of the metal plates of adjacent mountings with a special micrometer dial gage. The zero reading (R_o) is taken after the mountings are assembled in the creep testing frame, but before load is applied. After application of load, another reading (R_i) is taken to measure the initial deflection. Subsequent readings (R_t) are a measure of creep.

Initial deflection: $d_i = R_i - R_o$

Initial strain: $e = \dfrac{d_i}{b}$ where b = rubber thickness

Actual creep at time t: $C_a = R_t - R_i$

Unit creep at time t: $C_u = \dfrac{C_a}{b}$

Since various rubber compounds were tested more conveniently under equal unit stresses, softer compounds were deformed more than harder ones. Consequently comparisons of actual creep favor the harder compounds. In order to make comparisons on a more equitable basis, creep usually has been considered as percentage of initial deflection (called per cent. creep).

This is defined as:

$$C_{\%} = 100\frac{C_a}{d_i} = 100\frac{R_t - R_i}{R_i - R_o}$$

Characteristics of the Creep Curves

Typical creep curves on rectangular coordinates for six compounds tested under 50 psi shear stress at both 80 and 140° F. are shown in Figure 2. These materials, like all others, creep most rapidly immediately upon application of load and then more slowly. In general the curves may become either approximately straight lines at 100 to 200 days or may indicate continuously decreasing rates of creep. Although the creep rate may become very small for a rubber mounting which has been under stress for a long time, it never becomes zero. For some compounds the rate may again increase as shown in the curve for compound A at 140° F.

On semi-logarithmic coordinates in Figure 3, for the 80° F. tests, the creep curves can be approximated by two or three straight lines, each succeeding line having a greater slope. These curves illustrate the dangers inherent in extrapolation of creep curves based on experimental data covering only a short period of time after loading. They also explain why in some cases short-time creep curves have been reported linear on semi-logarithmic coordinates.

When plotted on logarithmic coordinates, as shown in Figure 4 for the 80° F. tests and in Figure 5 for the 140° F. tests, the creep data in general can be satisfactorily represented by straight lines for relatively long times. This linearity indicates a continuing decrease in creep rate with time. Occasionally the creep curves for some compounds depart from linearity during the early part of the test as for compound B at 80° F. and compound A at 140° F. In addition, the curves may depart upward from linearity for some compounds at about 100 days when tested at 140° F. as indicated by compound A. This break from the curve was not accompanied by any change in the physical appearance of the test specimen; so it may be caused by changes in molecular structure of the rubber.

Obviously a creep curve cannot be exactly linear on all three types of coordinates during the same period of time. These creep data happen to be of such nature that they can be satisfied over parts of their ranges almost equally well by linear, exponential, or parabolic equations.

Importance of Proper Compounding

The creep characteristics of natural and synthetic rubber compounds can be controlled over a wide range varying from the high plasticity of unvulcanized rubber to the low creep of vulcanized compounds designed for carrying continuous loads. The creep curves presented here illustrate some of the variations in creep found in a group of compounds, some of which were designed for rubber mounting service.

Compounds A, B, and C are made from natural rubber. Compound A adheres well to metal, but has only average

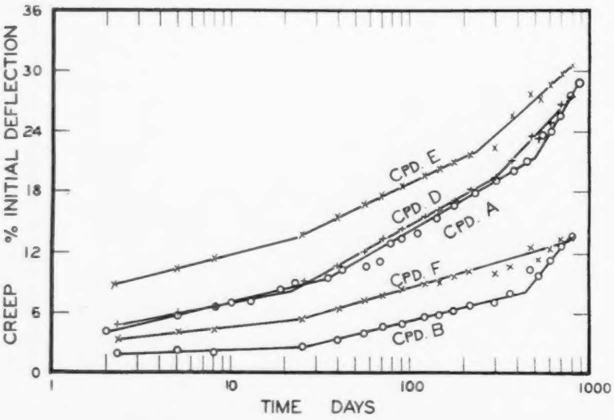


Fig. 3. Semi-Log Creep Curves of Shear Mountings

50 PSI **80° F.**

creep and does not age very well at 140° F. Compound B does not adhere to metal directly, but requires the use of an intermediate layer of "tie gum." Although its creep is very low, it cannot carry load for a long time at 140° F. It is interesting to notice that much of the creep shown by the curves for this compound is due to the tie gum which is 20% of the total rubber thickness in the mounting. Compound C, on the other hand, has low creep, good adhesion to metal, and has good aging resistance at 140° F.

Compound D, made of Neoprene Type E, was among the best of ten neoprene compounds tested. Four of these compounds failed within 40 days at 140° F.

Compounds E and F are made from a butadiene copolymer. Compound E is an example of a composition unsuited for suspensions. It has high creep and short life at 140° F. Compound F, however, has even lower creep on a long-time basis than compound C, the best rubber compound, and shows good aging properties.

It can be seen from the curves that compounds of rubber, neoprene, or butadiene copolymer can be made to have low creep and long life by proper processing and choice of ingredients. However a compound must have not only low creep, but also other properties of equal or greater importance, such as the correct hardness or spring rate, good adhesion to metal, good aging, and high tear resistance. It should be emphasized that the mechanical and chemical properties of rubber are interrelated in complex ways so that it is seldom possible to exaggerate or develop one characteristic without sacrificing one or more others. The compounder must ordinarily seek a well-balanced product.

Effect of Temperature on Creep

It has been seen that creep curves at 80 and 140° F. are similar in shape, but that with all compounds, creep occurs more rapidly at the higher temperature.

Table 1 lists per cent. creep, unit creep, and initial strains at 50 psi of the compounds shown in the curves.

TABLE 1. CREEP OF NATURAL AND SYNTHETIC RUBBER COMPOUNDS

		80° F.			140° F.		
	Approx. Shore Durometer Hardness	e Initial Strain In./In.	Creep at 640 Days		e Initial Strain In./In.	Creep at 640 Days	
Compound			$C_{\%}$	C_a In./In.		$C_{\%}$	C_a In./In.
A Rubber ..	43	.665	24.9	.164	.753	205.0	1.543
B Rubber ..	40	.773	11.6	.090	Failed before 640 days		
C Rubber ..	45	...	...	...	.596	48.9	.292
D Neoprene Type E...	46	.683	25.5	.173	.793	81.2	.643
E Butadiene Copolymer.	50	.928	28.7	.267	Failed before 640 days		
F Copolymer.	55	.520	12.7	.068	.435	33.0	.145

The maximum unit creep of any of these compounds in 640 days at 80° F. amounted to only 0.267-inch per inch, or 29% of the initial strain (compound E). The smallest unit creep shown by any compound in this time was 0.068-inch per inch, or 13% for compound F. At 140° F. creep is from two to nine times greater than at room temperature. The maximum creep in the compounds which lasted 640 days at the higher temperature was 1.543 inches per inch, or 205% for compound A; while the least amount of creep was only 0.145-inch per inch, or 33% for compound F.

It is interesting to observe that the creep of these rubber samples expressed as per cent. of initial strain is only a small fraction of the creep found in steel under some conditions of service. Table 2 compares with data for compound C data obtained in a joint ASME-ASTM creep study.[10]

[10] *Proc. Am. Soc. Testing Materials*, 37, Part 1, 178 (1937).

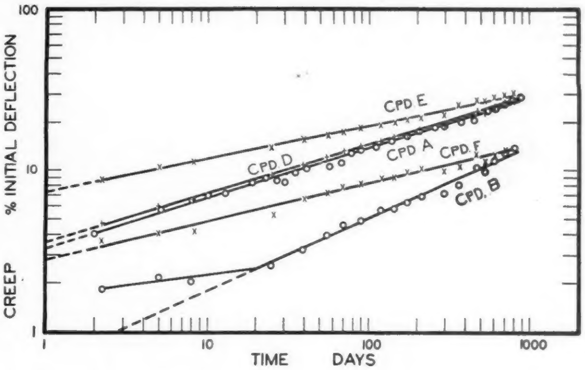


Fig. 4. Log-Log Creep Curves of Shear Mountings
50 PSI 80° F.

TABLE 2. CREEP OF STEEL AND RUBBER

	Initial Deformation Inches	Creep at 600 Days Inches	% of Initial Deformation
Specimen No. B12-1, 18% Cr, 8% Ni Steel, 1200° F.—8,345 Psi Tensile Stress	0.0006	0.0268	4470%
Specimen No. 25B-5, 0.35% Carbon Steel, 850° F.—7,500 Psi Tensile Stress	0.0005	0.0099	1954%
Rubber—Compound C, 140° F.—50 Psi Shear Stress	0.1853	0.0803	43.3%

The conditions under which the creep of these two materials were determined are, of course, very different, but they approximate actual conditions under which each might be used. Compound C was initially deformed 370 times more than the two steel samples, but had only 1 to 2% as much creep, expressed in terms of the initial deformations.

The linear part of the relation between creep and time on logarithmic coordinates (Figures 4 and 5) may be expressed by

$$\log C_{\%} = \log C_i \div n \log t$$
$$\text{or } C_{\%} = C_i t^n$$

Where $C_{\%}$ is creep.

t is time in days.

C_i is a constant, the intercept of the log-log curve at one day.

n is a constant, the slope of the log-log creep curve.

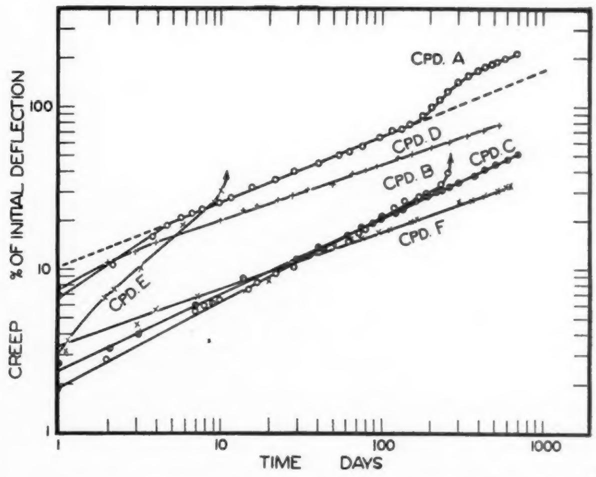


Fig. 5. Log-Log Creep Curves of Shear Mountings
50 PSI 140° F.

The values of the constants for the curves of Figures 4 and 5 are shown in Table 3.

TABLE 3. EFFECT OF TEMPERATURE ON CREEP CONSTANTS

	80° F.		140° F.		Ratio 140°/80°	
Compound	C_i	n	C_i	n	C_i	n
A	3.3	.31	10.2	.40	3.1	1.3
B	0.64	.44	1.9	.52	3.0	1.2
C	...	...	2.4	.46	...	...
D	3.6	.31	9.2	.34	2.6	1.1
E	7.4	.21	Failed	...	...	...
F	2.8	.24	3.4	.35	1.2	1.5

C_i and n are always greater at 140° F. than at 80° F. indicating both higher initial creep and a greater slope for all compounds. For these particular compounds the effect of temperature is about the same for rubber and neoprene while the compound of butadiene copolymer F has a smaller increase in C and a greater increase in n at the higher temperature. In another group of about 50 rubber compounds, C_i was found to be from 3 to 260% and n from 7 to 111% greater at 140° than at 80° F., depending on the compounding ingredients and on the degree of vulcanization. There are not yet sufficient test data on compounds of neoprene and butadiene copolymer to permit general conclusions concerning these relations.

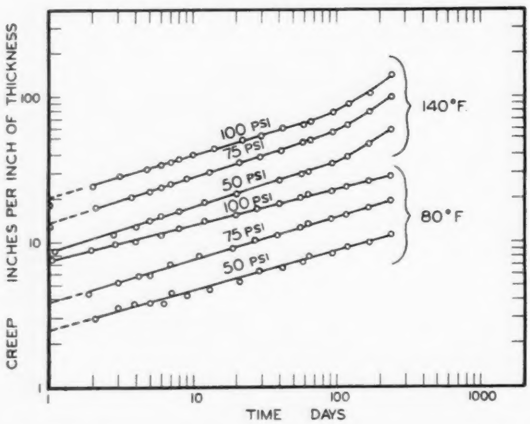


Fig. 6. Effect of Shear Stress and Temperature on Absolute Creep
CPD. G—Rubber

Effect of Temperature on Other Mechanical Characteristics

Higher temperatures not only increase initial creep and slope, but they will reduce, and in some cases may seriously impair, the load-carrying life of the compound. The chemical and physical nature of compounds of rubber-like materials is such that elevated temperatures bring about numerous slow changes in them. Among these changes may be mentioned additional cure with possible reversion (softening) or hardening effects, and loss of tensile strength and tear resistance. The rubber technologist refers to all effects of this type by the general term aging. It is estimated that the rate of aging is accelerated very roughly eightfold by a change of temperature from 80° F. to 140° F.

These aging effects are made evident in one case by the discontinuity of the 140° F. creep curve for rubber compound A, in Figure 5, at 150 days when the creep rate began to increase. This compound was removed from test at 690 days because of severe age-cracking. The inflection point at 150 days is probably caused by a change in the molecular structure of the rubber as a consequence of the more rapid aging at the higher temperature. Likewise rubber compound B failed at 270 days, and the butadiene copolymer, compound E, at 10 days at 140° F., although no inflection point occurred in either case.

If properly compounded and processed, however, as shown by curves for compounds C, D, and F, all these polymers may be relied upon to carry at least 50 psi shear stress at 140° F. for more than 700 days. How much longer they will last is not known for the test mountings are still in good condition.

None of these compounds failed or showed evidence of impending failure at 80° F. and 50 psi in the 900-day period up to the present time. Experience has shown that rubber products have given good service in actual installations for periods much longer than that covered by these tests. Some installations of shear mountings have been in service under heavy industrial machinery more than seven years with no indications of failure; while other types of mounting have been in service for more than 16 years.

Effect of Stress on Creep

Curves are shown in Figure 6 for the unit creep of a rubber compound (G), similar to compound A, stressed to 50, 75, and 100 psi at both 80 and 140° F. The constants of the logarithmic creep curves are shown in Table 4.

TABLE 4. EFFECT OF TEMPERATURE AND STRESS ON CREEP CONSTANTS OF A RUBBER COMPOUND

	140° F.		80° F.		Ratio 140/80° F.	
Stress Psi	C_i In./In.	n	C_i In./In.	n	C_i	n
50	.086	.31	.025	.28	3.4	1.1
75	.138	.34	.038	.30	3.6	1.1
100	.204	.29	.074	.24	2.8	1.2
				Average	3.3	1.1

The increase in C_i is not proportional to the stress, while the values in n change only slowly, if at all, with stress at any one temperature. The effect of temperature on creep is again shown by these data, where C_i is about 230% greater and n is about 14% greater at 140° F. than at 80° F.

In Figure 7 the data of Figure 6 are plotted as log creep in per cent. of initial deflection versus log time. Creep expressed in this way is independent of stress, but depends only on the temperature. The independence of per cent. creep and stress would appear to justify this method of comparison of soft and hard compounds. The agreement at 140° F. is better than at 80° F., but the differences at the latter temperature may be due to experimental error. Similar results were obtained with eight other rubber compounds.

Effect of Continuous Load on Shear Stress-Strain Curves

Figure 8 shows how the shear stress-strain characteristics of compound G are changed by conditions under which the creep data are obtained. Stress-strain curves of samples which were kept without stress at the two temperatures are shown for comparison. Shear mountings of compound G were maintained at each of the following conditions:

1. 140° F.—100 psi shear stress
2. 140° F.—no shear stress
3. 80° F.—100 psi shear stress
4. 80° F.—no shear stress

These mountings were removed from test periodically, and each time seven shear stress-strain curves of each mounting were obtained autographically on a specially

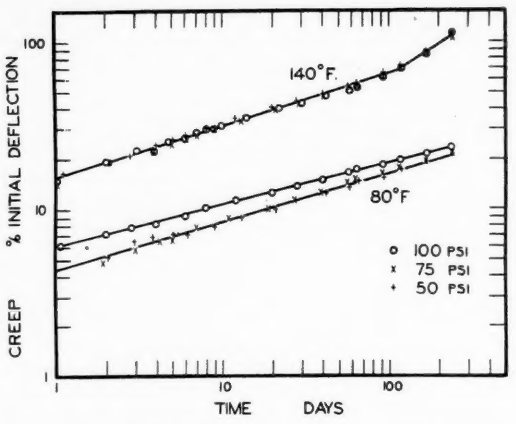


Fig. 7. Effect of Shear Stress and Temperature on Percentage Creep (CPD. G)

adapted Olsen testing machine. The curves in Figure 8 show the shear stress-strain curves for the loading portion of the seventh cycle of each of the four mountings before and after aging 210 days under the above conditions. Aging at 80° F., with or without the shear stress, produces only slight changes in the shear curves. At 140° F, however, there is some stiffening on aging. In 210 days the Shore durometer hardness increased from 48 to 54. The shear modulus (slope of the stress-strain curve) at 100 psi increased 20% for the unstressed mounting and 42% for the stressed mounting. However the deflection of the stressed mounting at 100 psi decreased only 12%. As a result of such an increase in modulus, a vibration isolator under these conditions would change in transmissibility from about 11% to about 17%, assuming an initial 3 to 1 ratio of disturbing to natural frequency.

Conclusions

Creep tests, extending in some cases as long as 900 days, indicate that both natural and synthetic rubbers such as neoprene and butadiene copolymer can be compounded to give satisfactory service in shear mountings.

At 140° F. creep is from two to nine times greater than 80° F., depending on the compound. Tests at room temperature do not indicate either the amount of creep or the life to be expected at higher temperatures. Actual creep (measured in inches) increases with stress, but when expressed as per cent. of initial deflection, it may be independent of stress.

Creep curves are linear over a considerable range of time when plotted on log-log scales. However extrapolation of such curves to predict results after very long times is not justified because the curves may not continue to be linear, or failure of the mountings may occur, particularly at high temperatures. Short time tests of any sort are not necessarily indicative of the relative creep or life of compounds in long-time service.

The tests reported here are a small portion of a large number which is being continued and augmented. It is hoped that these and other investigations now under way may contribute to clearing the picture of the complex interrelations between the many physical properties of compounds of rubber-like materials.

The rubber technologist uses his specialized knowledge to develop a wide variety of compounds making use of several types of basic rubber-like materials. He chooses whichever fits service requirements best from performance and economic viewpoints. Modern materials and recent developments in processing technique have made possible compounds suitable for a wide range of service conditions.

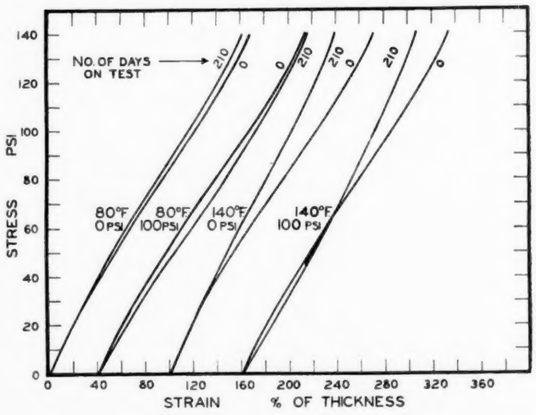


Fig. 8. Effect of Continuous Load and High Temperature on Shear Stress-Strain Curves (CPD. G)

Rai-Seal for Sealing Highway Joints

RAI-SEAL, a product of Rubber Associates, Inc., 1230 Sixth Ave., New York, N. Y., is described as a hot-poured-type rubber compound that has been used by state, county, and municipal public works and highway departments for sealing expansion joints in highways. Installations, both for new construction and the maintenance of existing concrete pavements, have ranged from areas subjected to temperatures as low as -40° F. to the high temperatures encountered in our southernmost states. The latest reports on installations made during the past four years are said to reveal that the expansion joints are still not only sealed, but that indications point to continued efficiency for an additional period of years. Rai-Seal, it is claimed, has also proved effective in such structures as bridges, sidewalks, airport runways, hangars, reservoirs, and swimming pools.

Rai-Seal is said to have the three essential characteristics of a continuous joint sealer: adhesion to concrete surfaces; resiliency at low temperature while being extended; and non-flowing properties at continued summer temperatures while under compression. Also this composition of rubber provides an effective seal against the infiltration of water or other foreign matter over a period of years without requiring repairs or maintenance.

Rai-Seal is recommended as a top seal for a depth of one inch to 1½ inches over a preformed filler strip of the non-extruding type. Open voids alongside of the premolded filler strip should be caulked with oakum or similar material; while the surfaces to be jointed should be substantially dry and free from loose scale, dirt, and other foreign matter. The method of installing Rai-Seal is essentially the same as that for bituminous materials. It is melted at 400 to 450° F., with care taken to avoid overheating, in a regular heating kettle and poured into the expansion joint space provided for the seal. Like bituminous materials, it may be exposed to traffic as soon as it has cooled—from 10 to 20 minutes. Rai-Seal is made in concrete color to blend with new concrete pavements and structures and in black for resealing.

EDITORIALS

Work, Production, and Defense

THROUGHOUT the nation and specifically from government officials comes the call to speed up our defense program. The urge is for more goods and more implements, all of which means that more work must be performed. Raw materials as such are of no value until applied labor has changed them into usable products. Consequently the essence of our success in this undertaking is the extent and the productiveness with which work is performed by the individuals of our country, whether they be office worker, craftsman, unskilled laborer, technician, or manager. Each has his work to do, and upon the spirit and manner in which each does his job will depend the effectiveness and speed in accomplishing such a program.

Our government administration has indicated the objectives; Congress has appropriated billions of dollars which must at some time be paid by the people, and industrial management has formulated plans of action, many of which are already in effect, and others are rapidly reaching the point when the finished goods will be coming from the production lines. More surveys of existing companies are being made as to available capacity for increased production either in normal or new lines of manufactures. Capacity is too often thought of solely in terms of floor space or machinery and equipment. The government is calling upon industry for greater production and for more and more speed.

Generally speaking, industry is composed of those who organize, plan, and direct production and those who operate machines or otherwise perform manual labor. All as individuals have the same stake in the security of this country, and all are assumed to have the same desire to contribute to the greatest possible degree in the accomplishment of the task before us. The accomplishment of these objectives is dependent very largely upon the number of man-hours spent in manual and mental labor and the efficiency of the individuals in utilizing that time. The need and the obligation are for every worker whether in the office or the factory to get the most out of his time and the machine or piece of equipment with which he may be working.

During recent years in order to spread the work so as to absorb surplus man power and by legally requiring increased hourly rates for labor above the standard work week, there has been a great tendency to shorten the hours of work for each individual, and in some instances the policy of labor unions has been for limited unit output. Experience abroad has already demonstrated that maximum production and maximum speed in preparedness measures necessitate an emphasis on more and better work rather than restriction. Likewise because of the present national debt and the indefiniteness of the period during which such vast defense expenditures will be needed, our national economy requires that the most effective use of defense funds be made. Interference with full production or demands which will result in higher costs can rarely be justified as having a proper place in our plans for national preparedness. There must be a sacrifice not only of money, but of some of our working conditions, and our lot during the approaching years will be made easier by an early recognition by all that each individual must produce the utmost for the time and money expended.

Increasing Need of Safety

WITH the present increase in industrial activity and the still greater stress on high production which is imminent through the coming months, the need of extreme care as regards safety measures becomes continually greater. Aside from the humanitarian viewpoint, alertness in preventing accidents is important to every production man because in the first place the exposure to accidents is being enlarged and in the second place the effect of lost time now is of national concern.

Under pressure of peak production more employes are involved, and the operators as well as the supervisors are subject to greater mental strain. Even with the general recognition of the increased accident hazard there is likely to be a tendency for the operator to forget the element of safety and to become unintentionally careless. He should be reminded frequently. In addition to the personal element relating to the movements of the individual, the possibility of accidents resulting from congestion of materials in the working areas and from deliberate sabotage is now increasingly important.

While it is necessary that the utmost precautions be taken to provide all possible guards and other mechanical safety devices, the most important element under the increasingly predominant conditions will be mental alertness by the safety directors, the production supervisors, and the factory operators. All must keep safety foremost in their minds and must refrain from taking chances. Difficult as it may be in these times of world turmoil and changing conditions, the attention and thoughts of each individual need be concentrated at all times on the immediate work in hand. This concentration is well worthwhile and through the minimizing of accidents will pay good dividends in individual personal welfare, higher overall production, lower cost to the individual and the company, and better quality in the products, many of which are destined to have a direct relation to the continued life of the user.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

Sibley Discusses Rubber Reactions before Canadian Section

R. L. SIBLEY, director of research, Monsanto Chemical Co., spoke on "The Chemical Reaction of Rubber," before the Ontario Rubber Section, Canadian Chemical Association, at a meeting on January 23 at the University of Toronto, Toronto, Ont. Dr. Sibley reviewed the patent and other published literature on the reactions of rubber other than those involved in vulcanization pointing out that, while rubber offered the possibilities of the reactions of a typical olefin, the only one which had received much attention was that of rubber-sulphur. Before presenting details on the reported reactions, the speaker emphasized the possibility that many of these reactions had not been carried to a final and valuable conclusion.

By heating alone some 23 hydrocarbons can be produced from rubber, according to Dr. Sibley; while the products resulting from oxidation and halogenation have proved of great interest. Chlorinated rubber and the cyclic rubbers were cited as having wide and diversified use. An experiment was mentioned in which rubber was reacted with increasing proportions of aqua regia to give a wide variety of products. It was pointed out that as the proportion of aqua regia was increased, the chlorine content showed a much greater tendency to increase than did the nitrogen content. In summarizing, Dr. Sibley pointed out that under proper conditions rubber forms addition products with many substances such as sulphur, oxygen, ozone, hydrogen, the halogens, the hydrohalides, dithiocyanogen, and dithioglycol, and forms substitution products with many other materials. Many of the reactions cited could be carried out on vulcanized rubber, according to the speaker. An interesting discussion followed the talk, after which W. E. Campbell, of Gutta Percha & Rubber, Ltd., expressed the appreciation of the group in a vote of thanks to Dr. Sibley.

The next meeting of the Section is scheduled for February 20 with dinner at the Hart House, preceding the meeting in the chemistry building of the University of Toronto. Talks will be presented by section members; O. B. Crowell, Viceroy Mfg. Co., Ltd., will speak on "Rubber Substitute as a Compounding Material"; while C. L. Brittain and his co-workers at Gutta Percha & Rubber, Ltd., plan to present a paper on the "Engineering and General Uses of Pyrometers in Rubber Factories."

Rubber Division, A. C. S., Activities

Spring Meeting of Division to Feature Symposium on Processing Developments

THE Division of Rubber Chemistry will hold its Spring Meeting in St. Louis, Mo., on April 10 and 11 as a part of the one hundred and first convention of the American Chemical Society. Headquarters of the Division will be at the Mayfair Hotel, where the technical sessions also will be held. The program will open on Thursday afternoon, April 10, with a Symposium on "New Developments in the Processing of Rubber." The four papers comprising the symposium and their authors are as follows: "Cold Resistance of Synthetic Rubber," W. J. McCourtney, Chrysler Corp., "New Developments in Injection Molding," H. W. Paine, M. L. Machp, and W. E. Rahm, Plastics Department, E. I. du Pont de Nemours & Co., Inc.; "New Developments in Instrumentation in the Rubber Industry," George P. Bosomworth, The Firestone Tire & Rubber Co.; and "New Mechanical Developments in the Processing of Rubber," by Andrew Hale, Farrel-Birmingham Co., Inc., The sessions on Friday, April 11, will be devoted to papers of a general nature.

F. W. Frerichs, chairman of the local committee in St. Louis, has promised that the program of the banquet, to be held Thursday evening, April 10, will be different from those of the recent past, in that the main feature will be a floor show and that the speeches will be few and short. According to Mr. Frerich, an excellent general program has been arranged for the whole convention, and members of the Division are urged to attend the meeting for the entire week.

The new Papers' Rules of the Division, now in effect, provide that the title of the paper to be presented, three copies of an abstract of 200 to 250 words, an estimate of the time needed for presentation, and the name of the laboratory in which the work was done shall be in the hands of the secretary, H. I. Cramer, University of Akron, Akron, O., by the usual deadline set by the Society (approximately eight weeks before the meeting). The deadline for the Spring Meeting is February 15. The submission of the complete manuscript, in triplicate, may be delayed until the date of presentation. Thus the judgment of the Papers Committee must be based entirely upon the abstract, which, therefore, should be not only concise but comprehensive, setting forth the purpose of the work, the important results, and the conclusions. Although the quality of the lantern slides used in the presentation of papers has been steadily improving, still greater care is urged to make these slides more legible.

Los Angeles Group to Hear Talk on Dutch East Indies

THE Los Angeles Group, Rubber Division, A. C. S., is scheduled to hear an authoritative talk on conditions in the Dutch East Indies at its monthly meeting on February 4 in "Rainbow Isle" of the Hotel Mayfair, Los Angeles, Calif. The program will be sponsored by the Kirkhill Rubber Co.

The name of the group's new secretary is Frank L. Shew, not F. L. Shaw, as reported in our January issue. Mr. Shew is with the Darnell Corp., Ltd., Long Beach, Calif.

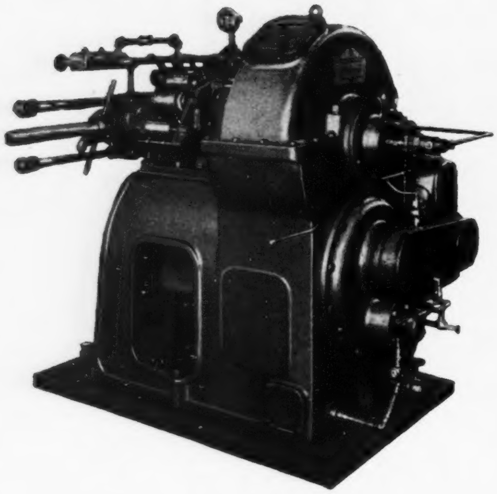
Back Issues of *Rubber Chemistry and Technology* Wanted

THE treasurer of the Division of Rubber Chemistry, A. C. S., C. W. Christensen, Rubber Service Department, Monsanto Chemical Co., 1012 Second National Bldg., Akron, O., informs us that he wishes to purchase the following back numbers of *Rubber Chemistry and Technology*, received in good condition at the price indicated: Vol. XI, January, 1938, $2 per copy; Vol. XIII, January, July, and October, 1940, $1 per copy.

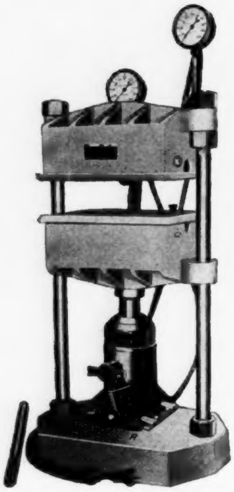
Water Wax Emulsions for Rubber

THREE water wax emulsions, RF 736, RF 737 (black), and RF 1362, are said to be made with close regulation of particle size so as to impart desirable luster to the surface of rubber articles. According to claims, the new finishes produce a water-resistant resilient film, which will resist cracking and scaling under ordinary circumstances where there is no excessive bending of rubber surfaces. On molded rubber surfaces the finishes tend to penetrate the pores and become a part of the product. RF 1362 is said to be particularly effective on soft rubber surfaces such as those produced from latex, the finish saturating the surface without producing a continuous film. Coverage is approximately 2,000 square feet per gallon, and application may be by dipping, spraying, or wiping on to the surface with a soft cloth, sponge, or brush. Applications include; auto parts, hose, toys, tubing, and insulated wire.

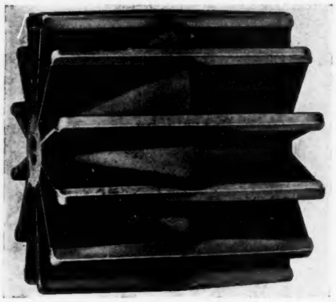
New Machines and Appliances



Dominion-Farrel Tuber, for Continuous Insulating, Showing Rachet Feed Mechanism, Splice Box, and Lubricating Pump and Piping



Miller Jack-Operated Press



Monarch Wing-Type Pulley

Continuous Insulator

RECENT improvements have been incorporated in the 3¼-inch Dominion-Farrel tubing machine built for use in the continuous insulating of wire. A telescopic-type splice box, which gives access to the wire as it passes from the tubing machine head to the vulcanizing tube, utilizes a sliding member that is locked in place by a quarter turn of a nut with interrupted threads similar to those used on gun breeches. A seal, held in place by steam pressure, prevents leakage when operating. The box is said to leave the wire clear from all obstruction during splicing.

The lubricating pump has been placed outside the machine base, making it more accessible and allowing more room for the motor. The problem of protecting the motor from oil has also been eliminated by this arrangement. The control for the variable speed unit has been brought out to the front of the machine, and the speedometer mounted in such a way that speed adjustments may be made and checked from the operating position. Sight feed lubrication is provided on both the chain cases, and a steel plate cover with a ventilating opening is used over the open end of the machine base to protect the motor. Two valve chests, each containing three valve units (for steam and hot and cold water) permit control of the heating or cooling of the head and barrel independently of each other. Dominion Engineering Co., Ltd.

Small Platen Press Utilizes Hand-Operated Jack

THE platen press, illustrated, which was designed primarily as a low-priced unit, utilizes electrically heated platens (10- by 12-inch) and a hand-operated hydraulic jack, capable of developing pressures up to 10 tons with a few strokes of the handle, it is claimed. In the electrical heating of the platens, steam pressure is generated which is indicated on two gages.

Said to be suited for specialty shops and laboratories, the press is designed for molding both rubber and plastics. The press is 30 inches high, weighs 270 pounds, and is built for either 110 or 220 volt A.C. operation. C. E. Miller Mfg. Corp.

Automatic Timers

A SERIES of 128 models of interval timers and time delay relays are powered by slow-speed, self-starting synchronous motors and equipped with fast-acting silver contact micro-switches. These all-electric controls, which are said to be designed for accurately timing many types of electrical equipment, are built in manual or automatic reset models for flush panel, enclosed surface, or wall mounting.

Paragon Timer

The new timers find application in the automatic operation of molding presses and as general-purpose timers for vulcanizing processes. One type automatically goes into operation immediately upon manual closure of the press and, after a preset time interval, automatically closes or opens an electrical circuit to open the press. Another type is preset by the operator at the start of the process, and at the end of the interval the timer closes a circuit to operate electrically a signal such as a bell or light. Paragon Electric Co.

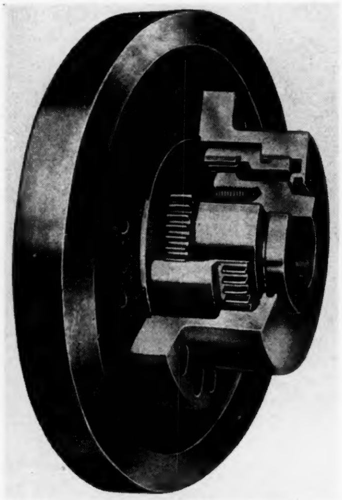
Wing-Type Pulley for Elevator and Conveyer Belts

THE Monarch Wing-Type Tail pulley is for use with elevator and conveyer belts carrying stone, sand, gravel, ashes, ore, and other sharp abrasive materials. Heaviest wear on belts carrying this type of materials is said to come from the material that falls on the under side of the belt and is carried around to be ground into the belt by the pulley face. With the wing and cone construction of this pulley material that is carried between the belt and pulley is forced between the wings and then out from the center by the cone to minimize damage to the belt. The Monarch pulley is interchangeable with solid pulleys and is made in a wide range of sizes, from 10 to 40 inches in diameter. Sprout, Waldron & Co., Inc.

Gear-Type Flexible Coupling

FOR connecting a shaft directly to a flywheel, brake drum, or flange, the Manger coupling is claimed to provide complete flexibility with approximately one-half the axial clearance required by other types of couplings. Also the dummy or stub shaft generally necessary with other types of couplings is eliminated. In addition to direct connection the new coupling may be used for connecting two free-ended shafts through the use of a solid, flanged, half coupling.

In the Manger coupling, compensation for misalinement is made by an internal



Manger Flexible Coupling

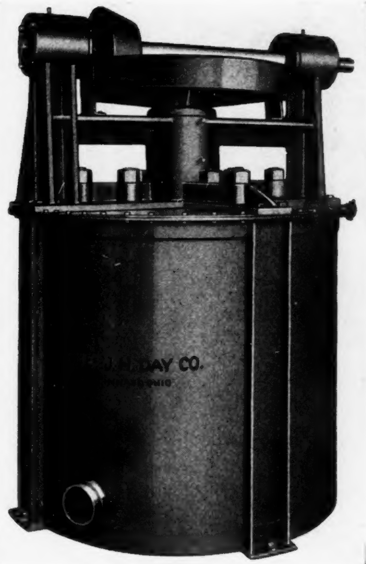
sleeve which floats between an externally geared hub and an internally geared covering sleeve. The internal sleeve, which engages the hub and outer sleeve, is free to slide and rock, adjusting for differences in alinement. The driving member of the coupling can be either the geared hub or the covering sleeve. Contact areas of gear teeth are large, and heavy oil lubricating the contact surfaces provides a cushion against shock. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Aluminum and Its Alloys Joined without Flux

COLAWELD "T" rod is said to enable the joining of aluminum and its alloys without the use of flux, also eliminating the necessity of roughening surfaces. The method of application is much like soldering. Where penetration is desirable, pre-tinning the surfaces with Colaweld "T" is recommended, followed by sweating the surfaces together. On other types of joints the rod is simply rubbed over the heated metal until it melts, or it is applied by spreading the molten material over the metal with an iron. Cracks or holes may be filled by heating them until the rod will flow into the hole upon contact. The rod also may be used for joining 18-8 stainless steel, copper, brass, monel metal, steel, galvanized iron, etc., when used with Colaweld liquid flux. Colonial Alloys Co.

Flashlight Bulb Extension

A HANDY flashlight accessory consists of a copper tubing encased in a bendable aluminum alloy tubing. Made in lengths of 6, 12, 18, 24, and 36 inches, this extension has a plug which will screw into any flashlight and a socket at the opposite end to receive the bulb. The device is said to permit the projection of light in many places difficult of access with an ordinary bulb or flashlight. Sierra Aircraft Co.



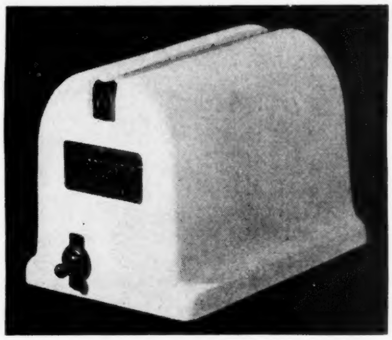
Day Hero Rubber Cement Mixer

Heavy-Duty Rubber Cement Mixer

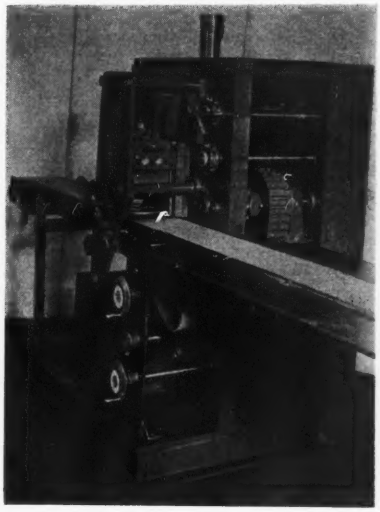
THE Day Hero rubber cement mixer is claimed to accelerate the dissolving of rubber over the preceding model through the use of less clearance and heavier construction, particularly in regard to the mixer blades. Four sets of stationary blades, spaced at 90 degrees, extend downward from the top frame of the mixer. Two sets of blades, spaced at 180 degrees, extend upward from special castings located in the bottom of the mixer and rotate with the vertical shaft. The close clearance between stationary and rotating blades is said to provide an efficient shearing action on the pieces of rubber to break them down rapidly, thus constantly exposing more surface to the action of the solvent. The mixer can be supplied in gangs of two or more and with jacketed tanks if required by the material to be processed. The J. H. Day Co., Cincinnati, O.

Electric Knife Sharpener

THE Sharpmaster, said to have found extensive use in rubber factories, is a compact electrical unit for sharpening knife blades of any size. In operation the knife is passed lightly between revolving wheels of aluminum oxide, spaced and interlocked to form a "V" shape. This spinning "V" principle is said to permit the sharpening wheels to come in contact with only the extreme edge of the knife, thus protecting the sides of highly polished blades.



The Sharpmaster



Utility Synchronized Cutter

All moving parts are enclosed in the outer case, and lubrication is provided by built-in oil reservoirs. The machine weighs five pounds and is four inches wide, six inches long, and four inches high. E. E. Krumeich Co.

Cutter for Synchronizing with Extruding Machine

THE Utility cutter, illustrated, is designed for synchronized operation with an extruder, measuring and cutting extruded stock as it is delivered. The new machine will make up to 100 cuts per minute and accommodate stocks up to two by four inches in cross-section; length range of the cutter is one to 25. The cutter is driven by a motor sufficiently large to drive the discharge and cooling tank belts also; while the variable speed device for synchronization purposes is of ample capacity to handle both the cutter and the cooling tank. Length changes, which may be achieved while the cutter is in operation, are controlled through a hand wheel. Utility Mfg. Co., Cudahy, Wis.

Paper Indicates Temperature

A CHEMICALLY treated paper, Sure-Temp, changes permanently from white to deep blue in color when the temperature rises above 328° F. At this temperature an opaque white coating over the paper's surface melts sharply to indicate by color change that the surface in contact with the paper has reached that degree of heat. An accuracy of from two to three degrees is claimed. Nashua Gummed & Coated Paper Co.

New Goods and Specialties

Kum-fy Bath Mat

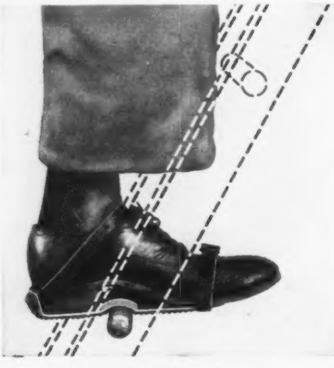
Rubber Bath Mat to Hold Babies Safely

THE Kum-fy bath mat for babies is of pliable soft rubber, molded to conform to the body contours of the child. It may be used in the bathtub or on the kitchen drainboard for holding the baby safely during its bath, or it may be used on the floor or on an auto seat for holding the baby in place. The mat is designed to keep the baby's head out of water and to permit the mother to use both hands while bathing the child. Inventor's Products, Inc.

Two Chlorinated Rubber Finishes

CHLORINATED rubber is used as the base of two new lacquer products—Paratex and Coprene. Paratex, a development of The Truscon Laboratories, is said to be suitable for wood or concrete floors, outdoors as well as indoors. The coating is resistant to alkalies, gasoline, alcohol, and chemical fumes, it is claimed, and may be applied by spraying, brushing, or dipping. It will dry sufficiently to be walked on in a few hours.

Coprene enamels, products of Maas & Waldstein Co., are said to dry in a very few minutes, becoming hard throughout on standing overnight or by force-drying for one hour at 200° F. According to the manufacturer, they have good adhesion, good resistance to outdoor weather and household chemicals, and retain their gloss, flexibility, and color well. Coprene enamels, which are said to be suitable for use on metal or wood, are made in clear, black, white, and colors, and also in metallic lusters.



Lad-R-Shu Attachment

Sheet Packings of Synthetic Materials

THE B. F. Goodrich Co., Akron, now offers two new types of sheet packing, one of the synthetic rubber, Ameripol, and the other of the synthetic elastic material, Koroseal. The dark sheet packing of Ameripol is said to be superior in oil resistance to natural rubber and other synthetic packings; to age well; and to provide excellent resistance to heat, cold, and water absorption. Its tensile strength is approximately 1,500 pounds per square inch; elongation, 400%; Shore durometer hardness, 78 to 82. The packing is made to order only in 100-pound rolls, about a yard wide in thicknesses ranging from 1/32- to 1/4-inch. A square yard of the 1/16-inch size weighs about 4¾ pounds.

The Koroseal packing is specially compounded to resist oils and solvents and will also resist some corrosives. Its tensile strength is about 2,200 pounds per square inch; elongation, 300%; Shore durometer hardness, 73 to 77. It comes in sheets 26 inches square and stock thicknesses of 1/32-, 1/16-, 1/8-, and 3/16-inch; other sizes, however, are made to order.

Neoprene-Asbestos Gaskets

ASBESTOPRENE gaskets, made by coating an impregnated asbestos material with neoprene, are said to be adaptable for sealing oil, water, gasoline, anti-freezes, air, and gases, particularly where considerable heat is involved. Compressibility and resilience are less than in the case of cork, but greater than most treated papers. Dimensional changes under conditions of high humidity and extreme dryness are said to be negligible; while gaskets suspended with weights attached show little stretch. Also the gaskets are claimed to be little affected by the time or conditions of storage. Heavy stud pressure is not required for a tight seal; a five foot-pound pull, as measured with a torque wrench, is ordinarily adequate. Victor Mfg. & Gasket Co.

Non-Slip Shoe Attachment for Ladder Workers

THE Lad-R-Shu is a device to be strapped to a regular shoe and is designed to protect ladder workers from the dangers and discomforts of ladder climbing and standing. The attachment consists of a steel plate with a slip-proof bottom of rubber matting and a grooved arch that grips the ladder. Leather straps hold the device firmly against the sole of the wearer's shoe. Light in weight, the Lad-R-Shu is said to be convenient to carry and wear and easy to walk on. Landon P. Smith, Inc.

Goodyear Hammermill Belt

Klingtite Belt for Hammermill Service

A NEW Klingtite transmission belt, designed specifically for severe hammermill service, utilizes a folded seam-on-edge construction which has no internal seams or outside sealing strips. Long flex life over small hammermill pulleys is said to be assured through the use of frictioned plies of soft heavy duck and a liberal skim coat between plies. The belts are built "endless" at the factory with a special envelope splice and are treated with inhibitor to guard against mildew attack during idle periods. Standard sizes include six- and seven-inch widths in lengths of 50, 60, and 75 feet. Goodyear Tire & Rubber Co.

Golf Training Device

SWINGTEST, a simple training device for golfers which can be used in any space large enough to swing a golf club, consists of a live rubber ball attached by a braided wire cable and ring to a vertically displaced tempered wire coil. The wire coil is supported by a spindle, which in turn is attached to a heavy metal base for outside use or a rubber mat for either indoor or outdoor use. When the ball is struck, it rotates about the stake, and the speed of rotation gives an indication of the effectiveness of stroke. Paul-Rohland, Inc.

Swingtest Golf Training Set

UNITED STATES

Greater Industrial Activity Forecast for 1941

Last year closed with industrial activity at record proportions, and it is believed an even higher rate, about 20% more, will be achieved this year. For 1940 industrial output was estimated 13% above that of 1939 and 10% above the previous record year, 1929. Although 1941 will be a busy year, it will not be an easy one, when one considers the mounting taxes and public debt, the international situation, and consideration for the inevitable readjustment after defense preparations shall have ended.

Output, consumption, and exports of the chemical industry have been at record figures, and to meet current and future expected demand large expenditures for plant expansion have occurred. Rayon production last year, at the high of 460 million pounds, was 20% above that of 1939. Cotton mills terminated 1940 at or near the best levels of their history, with a heavy load of unfilled orders on hand. Sales of electric appliances last year exceeded those of '39 by about 26%, and a further increase of 15 to 20% is foreseen this year. Farm equipment manufacturers also expect 1941 sales to be 5 to 10% greater than in 1940, which was approximately 20% above the year before. The retail trade likewise believes sales will rise 8 to 13% this year. Paper production at a new peak in 1940 was 5% greater than in 1939, and with the present backlog the industry feels that high productivity will be maintained well into 1941. It is likewise believed that furniture sales this year will better those of 1940 by at least 25%. Machine tool makers who last year doubled the output of the previous year are set to duplicate the feat in 1941, and sales should total $600,000,000. Railroad loadings are expected to be 7 to 10% greater than in 1940; while heavy construction is seen bettering the 1929 figure. Steel output has reached 99.1%, or virtual capacity, and the industry anticipates a continued high rate into May at least. In the automobile industry the 1941-model-year opening saw the largest volume of retail sales of any fall, and manufacturers feel sure that they will beat the 1940 mark of approximately 4,400,000 passenger cars and trucks by about 15% to give the industry its second five-million vehicle year. In 1929 sales of cars and trucks totaled 5,358,420. It is also felt, however, that manufacturers may not be able to meet all consumer demand this year, for they may have to divert production to fill defense orders, although such a move has not yet become necessary.

The year-end holidays cut into production figures; but with full schedules resumed gains have since been recorded for automobile, rayon, steel, tin, paper, lumber, and power output, carloadings, and the cotton mill rate.

The past year in many respects was a record one for the rubber industry. Consumption was estimated at 618,349 long tons, against previous highs of 592,000 tons in 1939 and 575,000 in '36. Production of pneumatic casings rose to about 58,750,000 units from 57,612,731 in 1939; and shipments kept pace, 59,155,326 units against 57,508,775. National defense orders plus increased automobile production created greater demand for miscellaneous rubber goods. The value of manufacturers' inventories dropped recently, but the value of shipments advanced considerably. Indications are that rubber production in general last month would be greater than in December, and the industry believes the pace will be maintained throughout the first quarter at least.

CALENDAR

Feb. 4.	Los Angeles Rubber Group. Mayfair Hotel.
Feb. 12-14.	AMA Annual Personnel Conference. Palmer House, Chicago.
Feb. 20	Ontario Rubber Section. University of Toronto.
Feb. 28.	Buffalo Rubber Group.
Mar. 3-7.	A. S. T. M. Committee Week and Spring Meeting. Mayflower Hotel, Washington, D. C.
Mar. 4.	Los Angeles Rubber Group. Mayfair Hotel.
Mar. 7.	Nichols Medal Award. Chemists' Club, New York.
Mar. 12-14.	"5&10" Packaging Show and Conference. Hotel Astor, New York.
Mar. 17-19.	N.A.W.M.D. Convention and Exhibit. Hotel Sherman, Chicago.
Mar. 28.	Boston Rubber Group. University Club.
Apr. 1-3.	A.S.M.E. Spring Meeting. Atlanta, Ga.
Apr. 10-11.	Rubber Division, A.C.S., Spring meeting. Mayfair Hotel, St. Louis.
May 26-29.	National Association of Purchasing Agents Convention. Stevens Hotel, Chicago.

EASTERN AND SOUTHERN

U. S. Rubber News

The United States Rubber Co., 1230 Sixth Ave., New York, N. Y., on January 6 held a five-day sales conference of division and district managers of the tire division at the Fisk plant, Chicopee Falls, Mass., under the leadership of company executives from New York. Sales, advertising, and promotion plans for 1941 were discussed.

P. A. Miller, who for the past three years was in the technical department of the company's plantations in Netherland India, has been transferred to the Providence, R. I., plant, where, in the development department, his work will be in relation to latex products.

Stuart T. Edgerton, of U. S. Rubber, Co., is a member of the Paper Committee of the National Association of Purchasing Agents, Inc., 11 Park Place, New York.

Ventilated U. S. Naugahyde

The company's coated fabrics division at Mishawaka, Ind., now markets an improved U. S. Naugahyde known as Ventilated U. S. Naugahyde. This seat-covering material is said to be the only artificial leather with free-breathing air pores; these are not punched, but seared into the tough leather-fiber-and-rubber compound without leaving any raw edges. The pores also form a pattern in the material, but are not too discernible in the darker shades. As the threads are not cut, but spread apart permanently for each pore, the manufacturer claims the backing will maintain its strength.

New Fisk Tires

The Fisk tire division of U. S. Rubber, has announced several new tires and tubes for 1941. The six tires for passenger cars include: two new Fisk Safti-Flights, one engineered for rayon and the other for cotton; Fisk Air-Flight Deluxe, an entirely new first-quality tire; and the improved Air-Flight, Windsor, and Multi-Grip. In the Safti-Flights, which top the passenger-car line, the seven-rib tread is used for stability and reducing the hazard of side skids. As an aid in emergency stops, transverse white rubber tread strips reach the full depth of the tread. Advantages attributed to these tires are greater mileage, easier riding and steering, and smooth, silent performance.

The six new truck tires are: Fisk Delivery, Fisk Transportation of rayon and also of cotton, A-S Truck Tire, Safti-Flight and Multi-Grip. Fisk Delivery is built of rayon for heavy-duty long, fast hauls and in delivery service. Easy rolling is claimed to result from a lighter, more flexible body and continuous riding ribs in the tread; extra strength of body, from a larger dimensioned body of improved, anti-friction, heat-resisting rayon cord; and extra mileage, from a new 10% deeper tread of broad, flat, extra proportions which resists grinding wear of "stop and go" service.

The three passenger-car tire tubes are: Safety Sealer; Safti-Base, of two heavy gage stocks of heat-resisting rubber, and Fisk Heavy-Duty. Two truck tire tubes, Fisk Transportation and Fisk Heavy-Duty, also are new.

Rubber Reclaimers Association, Inc., held its annual meeting in New York, N. Y., on January 14 at which the following officers were elected: president, John P. Coe, Naugatuck Chemical Division, United States Rubber Co., New York; vice president, E. H. Brooks, Goodyear Tire & Rubber Co., Akron, O.; secretary-treasurer, Mrs. M. B. Miller (re-elected). The directorate now consists of Mr. Coe; Allyn Brandt, Philadelphia Rubber Works Co., Akron; J. F. McLean, Pequanoc Rubber Co., Butler, N. J.; L. J. Plumb, U. S. Rubber Reclaiming Co., New York; and H. S. Royce, Boston Woven Hose & Rubber Co., Cambridge, Mass.

Foster Dee Snell, head of the firm of consulting chemists and chemical engineers, Foster D. Snell, Inc., 305 Washington St., Brooklyn, N. Y., has been elected president of the Alumni Association of the Graduate Schools of Columbia University, from which he had received his M. A. in 1922 and a Ph.D. in chemistry the next year.

American Institute of Physics, Inc., 175 Fifth Ave., New York, N. Y., in arrangement with Reinhold Publishing Corp., 330 W. 42nd St., New York, this month is releasing the book, "Temperature—Its Measurement and Control in Science and Industry," which offers in permanent form the papers presented at a symposium on the subject sponsored last winter in New York in cooperation with the National Bureau of Standards and the National Research Council.

Motor & Equipment Manufacturers Association, Fisk Bldg., New York, N. Y., according to General Manager A. H. Eichholz, held its directors' meeting on January 14 at which the following officers were elected for the current year: president, H. R. Kerans, The K-D-Lamp Co., Cincinnati, O.; vice president, R. B. Davis, Raybestos-Manhattan, Inc., Bridgeport, Conn.; secretary, E. A. Hall, The Hall Mfg. Co., Toledo, O.; treasurer (reelected), C. P. Brewster, K-D Mfg. Co., Lancaster, Pa.

The Okonite Co., manufacturer of insulated wires, cables, and splicing tapes, Passaic, N. J., according to President F. C. Jones, to meet increasing demand in the South on January 15 opened its sixteenth district office (South Central territory), at 1212 Comer Bldg., Birmingham, Ala., with Dewey A. White as manager, covering Tennessee, Alabama, Mississippi, and Louisiana. Mr. White, with the company 17 years and recently sales engineer at the Atlanta, Ga., office, will handle insulated wires and cables made by The Okonite Co., The Okonite-Callender Cable Co., Inc., and the Hazard Insulated Wire Works Division. The South Atlantic territory (North and South Carolina, Georgia, and Florida) will continue under Geo. N. Brown, manager of the Atlanta office. On January 3, Okonite moved its St. Louis, Mo., office from the Ambassador Bldg. to larger quarters at 1406 Shell Bldg. Robert E. Sontag is manager.

Cameron Has Permanent Machine Exhibit

The Cameron Machine Co. has established at its plant, 61 Poplar St., Brooklyn, N. Y., a permanent exhibit of slitting and roll winding machines together with a modern display of fabrics and papers that are slit and wound into rolls. The machine exhibit proper includes many different types and sizes, some of which are of universal application while others are designed for special use.

The Cameron Machine Co. invites inspection of this instructive well-arranged display. Rubber mill officials will be particularly interested in the rolls of electricians' friction tape, masking tape, sponge rubber, rubber shim, rubber belting, gasket material, bathing cap stock, varnished cambric, waterproof pipe wrap, gutta percha, and other materials pertinent to their line of manufacture which have been produced on the Camachines, many of which are shown on the adjacent exhibit floor.

Greetings, Calendars, and Souvenirs

The staff of India Rubber World gratefully acknowledges the following holiday mementos:

Monogrammed penknives and desk calendars from the Naugatuck Chemical Division of United States Rubber Co., New York, N. Y.

Personalized memo paper from the Pequanoc Rubber Co., Butler, N. J.

Desk blotters carrying pictures of the executive personnel of Whittaker, Clark & Daniels, Inc., New York.

Pocket memorandum books from General Atlas Carbon Co., New York, and John Royle & Sons, Paterson, N. J.

A box of celery from the Gates Rubber Co., Denver, Colo.

Monogrammed key cases from *Tires* Magazine, New York.

Memo-Dex, a combination wallet and memo pad, from Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Useful calendars from Bibb Mfg. Co., Macon, Ga., Bridgwater Machine Co., Akron, O.; General Electric Co., Schenectady, N. Y.; Hercules Powder Co., Wilmington, Del.; Lavelle Rubber Co., Chicago, Ill.; National Rubber Machinery Co., Akron; The Oak Rubber Co., Ravenna, O.; Pittsburgh Plate Glass Co., Columbia Chemical Division, New York; and C. K. Williams & Co., Easton, Pa.

Attractive greetings from Eric Bonwitt, Akron; R. W. Albright, of American Anode, Inc., Akron; Barr Rubber Products Co., Sandusky, O.; Archie Kemp, of Bell Laboratories, Inc., New York; Guy L. Hammond, of Black Rock Mfg. Co., Bridgeport, Conn.; J. M. Bierer and James Walton, of Boston Woven Hose & Rubber Co., Cambridge, Mass.; Fred H. Amon, of Godfrey L. Cabot, Inc., Boston, Mass.; The Cleveland Liner & Mfg. Co., Cleveland, O.; E. Bridgwater, of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; D. C. McRoberts, of Gates Rubber; Thos. L. Gatke, Gatke Corp., Chicago, Ill.; Geo. D. Kratz and General Latex & Chemical Corp., Cambridge; Preston B. Bergin and R. E. Powers, of The B. F. Goodrich Co., Akron; Lester D. Bigelow, of Hewitt Rubber Corp., Buffalo, N. Y.; Donald D. Wright, of Hood Rubber Co., Watertown Mass.; Hydrocarbon Chemical & Rubber Co., Akron; Harrison E. Howe, of *Industrial and Engineering Chemistry*, Washington, D. C.; E. A. Hauser, of Massachusetts Institute of Technology, Cambridge; Jules Muehlstein, of H. Muehlstein & Co., Inc., New York; John T. Stricklen, of National Rubber; Royce J. Noble, Malden, Mass.; Fred Traflet, of Pequanoc Rubber; Allyn I. Brandt, of Philadelphia Rubber Works Co., Akron; H. Mark, of Polytechnic Institute of Brooklyn, N. Y.; Bevis Longstreth, of Thiokol Corp., Trenton, N. J.; Jerome T. Shaw, of *Tires*; G. L. Roberts, of United Carbon Co., Charleston, W. Va.; Harry I. Fisher, of U. S. Industrial Alcohol Co., Stamford, Conn.; E. G. Holt, of United States Leather and Rubber Division, Washington; A. A. Somerville, of R. T. Vanderbilt Co., Inc., New York; Allyn Thayer, of C. K. Williams; and Robert I. Wishnick, of Wishnick-Tumpeer, Inc., New York.

The Barrett Co., manufacturer of chemicals, 40 Rector St., New York, N. Y., has been commended by The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, because it recently ran in a magazine with nationwide circulation an advertisement emphasizing the importance to national defense of rubber reclamation in increasing the rubber supply of the United States. A point of the advertisement was that in 1940 almost one-third of the rubber used in this country was reclaimed.

Protex Products, manufacturer of household accessories, Jersey City, N. J., is marketing "mother and daughter" aprons of Pliofilm, in patriotic theme, with trimmings of red and white stripes on blue. Another Pliofilm product is Ped-ettes, featherlight, waterproof, snug-fitting slip-ons designed for wear over stockings under open-toe shoes, evening slippers, and other footwear as protection against wet feet in rainy and snowy weather. Ped-ettes, are suggested, too, for men who hate to wear rubbers. They are also recommended to be worn over bare feet in locker rooms, showers, and swimming pools and at the beach to guard against athlete's foot, ringworm, etc.

Jack Byrne, Seiberling tire dealer of Syracuse, N. Y., with his general manager, Wm. Kearney, recently returned from his annual visit to the plant of the Seiberling Rubber Co., Akron, for conferences on new developments to be spread among his organization. While there he met Chairman F. A. Seiberling, Akron Branch Manager G. N. Kinkaid, Sales Manager J. L. Cochrun, and Ed Towe, Akron branch salesman.

Rubber at the Boat Show

Rubber marine products were prominently displayed at the thirty-sixth annual National Motor Boat Show, held at the Grand Central Palace, New York, N. Y., from January 10 to 18, inclusive, except Sunday, January 12.

Lucian Q. Moffitt, Inc., Akron, O., exhibited Goodrich rubber cutlass propeller shaft bearings in a wide range of sizes, with a demonstration of the behavior of three types of bearings, bronze, rubber, and lignum-vitae, operating in sandy water. Of the three, the rubber bearing was the only one shown to resist the scoring action of the grit in the water. Rubber marine bearings of the Akerite type were featured by E. J. Willis Co., New York, who also displayed Goodyear Air Foam mattresses and cushions for marine application.

Cluff Fabric Products, Inc., New York, showed new-type rubber fenders and gunwale protectors comprising heavy duck casings stuffed by special methods and machines with ground latex sponge rubber. The packing operation is said to render the rubber practically solid so that if a casing should become ripped, little rubber would be lost. This firm also showed U. S. Rubber's Royal Foam mattresses and cushions. Socony-Vacuum Oil Co., Inc., New York, had on exhibit its Wearpruf rubber fenders with the following types of filling: non-collapsing, air-cell expanded rubber; shredded rubber; and combination granulated sponge rubber and granular cork, packed without adhesive. A gunwale guard also filled with air-cell expanded rubber was on display at this exhibit.

A galvanized sheet iron mooring buoy, with a rubber bumper, and all-rubber oar stops were shown by Wilcox, Crittenden & Co., Inc., Middletown, Conn. Topsider yachting footwear with non-slip rubber soles were featured by Sperry Shoe Co., New Haven, Conn.

The Institute of Aeronautical Sciences held its annual meeting at the Biltmore Hotel, New York, N. Y., on January 30. At the session devoted to organic and synthetic materials James W. Schade, research director of The B. F. Goodrich Co., Akron, O., discussed "Rubbers, Natural and Synthetic," tracing their development, properties, and application in various services. Dr. Wm. C. Geer, former research head at Goodrich and inventor of the airplane deicer, was chairman of the symposium.

Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N, Y., is reported contemplating erecting a 250- by 580-foot factory for making Vinylite at Bound Brook, N. J., to cost more than one million dollars.

American Management Association, 330 W. 42nd St., New York, N. Y., on February 12, 13, 14 will hold its annual personnel conference at the Palmer House, Chicago, Ill., when personnel policies and industrial relations problems under present-day emergency conditions will be discussed.

Exports Subject to License

Presidential Proclamation No. 2451, dated December 20, 1940, in the interest of national defense rules that on and after January 6, 1941 several miscellaneous products, including the following, "shall not be exported from the United States except when authorized in each case by a license as provided for in Proclamation No. 2413 of July 2, 1940": abrasives and abrasive products containing emery, corundum, or garnet, as well as abrasive paper and cloth; plastic molding machines and presses; testing machines; and hydraulic pumps.

Regulations, Executive Order No. 8617, also of December 20, defines the above terms as follows:

Abrasives and Abrasive Products:

1. Wheels of emery, corundum, and garnet.
2. Grindstones of natural and of artificial abrasives.
3. Artificial abrasives, crude and in grains.
4. Abrasive paper and cloth.
5. Other natural and artificial abrasives, hones, whetstones, etc.

Testing Machines: Tension, ductility, compression, hardness, torsion, and flaw testing machines, including dynamometers.

Hydraulic Pumps: Gear, vane, and piston-type pumps capable of delivering pressures of 100 pounds per square inch and over, and controls for the same.

Another presidential proclamation, dated January 10, 1941, and effective February 3, added six more strategic materials to the list under licensing system, including:

Wire: Bare, insulated wire and cable; rubber-covered and weatherproof wire; other included wire; other primary fabrications; fabrications for munitions purposes, and alloys, other than brass and bronze.

But on January 18 Secretary Hull issued general licenses for the export to Canada of about 150 articles and materials deemed necessary to national defense, dispensing with the requirement of individual export licenses. An executive order of January 15 provided for issuance of "blanket" licenses for shipment of war materials to Britain. The list for Canada included abrasives and abrasive products, plastic molding machines and presses, testing machines, and hydraulic pumps.

The National Automobile Show, scheduled for the Fall of 1941 in New York, N. Y., has been cancelled to allow manufacturers to meet the demands of national defense, according to Alvan Macauley, president of the Automobile Manufacturers' Association. This action, however, will not affect plans of individual companies regarding presentation of new models this fall, although model changes will be regulated by the needs of the rearmament program. In anticipation of possible reduced car and truck schedules in order to handle defense requirements manufacturers since the introduction of the 1941 car last fall have been operating at high levels.

Supply Contracts Awarded

The following were included among recent listings of contracts awarded by various departments of the United States Government:

Navy: *cable,* Bishop Wire & Cable Corp., New York, N. Y., \$30,770.50, Collyer Insulated Wire Co., Pawtucket, R. I., \$96,473.70, Okonite Co., Passaic, N. J., \$28,333; *hose,* Raybestos-Manhattan, Inc., Passaic, \$43,392, Quaker Rubber Corp., Philadelphia, Pa., \$36,120, United States Rubber Co., New York, \$73,618; *tank lining,* Raybestos-Manhattan, \$44,520; *wheels, airplane,* Goodyear Tire & Rubber Co., Akron, O., \$5,000.

War: *adhesive plaster,* Marsales Co., Inc., New York, \$10,237.25; *blankets, rubber, and surgical cushions,* U. S. Rubber, \$18,651; *chemicals,* E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., \$9,791; *coats, firemen's,* Chicago Rubber Clothing Co., Racine, Wis., \$4,841, U. S. Rubber, \$4,365; *cotton textiles,* Wellington Sears Co., New York, \$257,727; *disks,* B. F. Goodrich Co., Akron, \$7,144; *faceblanks,* Firestone Rubber & Latex Products Co., Fall River, Mass., \$225,258, Goodyear, \$54,000; *gaskets and valves,* Firestone Tire & Rubber Co., Akron, \$1,938; *mats, floor,* Rubbercraft Products Co., Akron, \$17,846; *mosquito bars,* A. B. C. Rubber Specialties, Brooklyn, N. Y., \$13,400; *raincoats,* Archer Rubber Co., Milford, Mass., \$218,225, Cable Raincoat Co., Boston, Mass., \$430,668, Cambridge Rubber Co., Cambridge, Mass., \$86,914, Chicago Rubber, \$129,847.50, Sigmund Eisner Co., Red Bank, N. J., \$181,239.50, Hodgman Rubber Co., Framingham, Mass., \$156,370, Kay Sportswear Co., Philadelphia, \$194,650, King Kard Overall Co., Philadelphia, \$205,983, Marathon Rubber Products Co., Wausau, Wis., \$5,654, Monarch Coat Co., Boston, \$435,600; *rubber bands,* General Tire & Rubber Co., Wabash, Ind., \$80,887; *tires,* Seiberling Rubber Co., Akron, \$25,488; *webbing,* Everlastik, Inc., Chelsea, Mass., \$70,544, Russell Mfg. Co., Middletown, Conn., \$28,746.

The O'Sullivan Rubber Co., Inc., Winchester, Va., manufacturer of "O'Sullivan's" rubber heels, soles, taps, etc., has disposed of its Gettysburg, Pa., operations to the Victor Products Corp., Hagerstown, Md., and in future, merchandise previously supplied by O'Sullivan to the shoe factory trade, consisting of "Surefoot", "Leviathan", "Camel", "Victor", and "Torvic" brands, will be made by Victor Products, which has engaged in rubber manufacturing for 15 years and also operates a reclaim rubber plant at Hagerstown. According to Earl Bunting, president of O'Sullivan, the move was made to enable his company to concentrate its manufacturing and merchandising efforts on O'Sullivan-brand merchandise sold through shoe finding jobbers and to shoe manufacturers. The O'Sullivan brand business has grown to such an extent in recent years that the full production facilities of the O'Sullivan plant at Winchester are needed for its branded business.

The American Chemical Society recently purchased for use as national headquarters a five-story apartment house, at 16th and M Sts., N.W., Washington, D. C., occupancy of which is planned in May. The Secretary of the Society with his office force will need at least one floor, and the staff of *Industrial and Engineering Chemistry*, now at 706 Mills Bldg., Washington, will need perhaps another. Disposition of the remaining space has not yet been definitely determined.

The Commodity Exchange, Inc., 81 Broad St., New York, N. Y., on January 21 held its annual meeting at which governors were elected to represent the various groups. For rubber are G. Leroy Scheinler, vice president of Robert Badenhop Corp., Woolworth Bldg., New York, for three years; and Louis V. Keeler, managing partner of Avia Co., 89 Broad St., for two years to fill the unoccupied term of the late Wm. E. Bruyn. On January 23 the board of governors elected Edward L. McKendrew, vice president of Armand Schmoll, Inc., 41 Park Row, as president of the Exchange, and Floyd Y. Keeler, of Orvis Bros. & Co., 14 Wall St., treasurer. Charles Slaughter, of Slaughter, Horne & Co., 66 Beaver St., the retiring president, was named vice president to represent the rubber group.

National Association of Waste Material Dealers, Inc., Times Bldg., New York, N. Y., will hold its twenty-eighth annual convention at the Hotel Sherman, Chicago, Ill., March 17 to 19. An innovation will be the presentation of an equipment and industry exhibit. Those interested should communicate with the Association in New York or the convention committee chairman, George Birkenstein, 332 Michigan Blvd., Chicago.

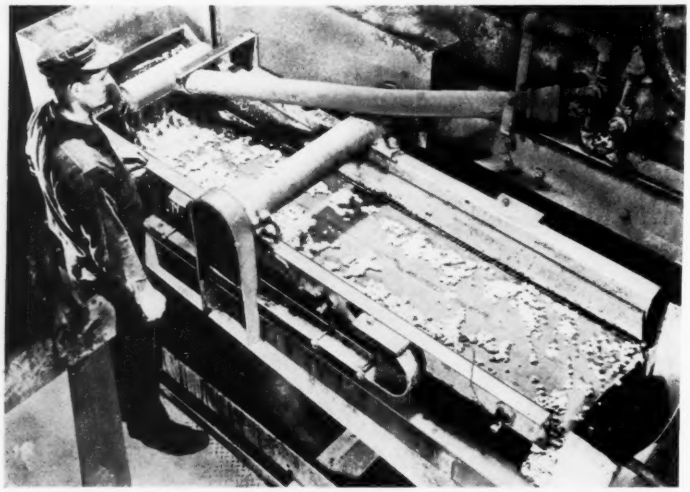
OHIO

General Tire Expanding

The General Tire & Rubber Co., Akron, according to President Wm. O'Neil in an annual report, has adopted an expanded factory and sales program to meet the demands of national defense and the replacement tire market. All plant facilities are now operating at capacity, and construction has begun on a new building to increase the factory floor space at Akron by 25%. Mr. O'Neil further declared that the company has practically completed liquidation of its inventories and receivables in Holland and Scandinavia without appreciable loss. The plant of the company in Venezuela with which General has a management contract is under construction and expects to start production of tires next month. Preliminary negotiations have been ended for the establishment of a tire manufacturing firm in Chile.

Sales Conference

General sponsored a two-day conference on January 14 and 15 of company officials and more than 200 General Tire distributers from all parts of New England, at the Copley-Plaza Hotel, Boston, Mass., to introduce new lines and discuss extensive advertising and sales plans. Among those attending were Mr. O'Neil; L. A. McQueen, vice president in charge of sales, who predicted a record volume of tire sales for 1941; and J. W. Haggerty, Boston district manager, who presided. Boston was the third city to have a conference, and others are following so that the General executives will conclude their tour in California the end of this month.



Between 40 and 50 pounds of rubber per hour, formerly wasted, are said to be recovered on this two- by eight-foot Link-Belt vibrating screen at the plant of the Essex Rubber Co., Trenton, N. J. The screen, equipped with a 100-mesh stainless steel screen cloth, handles sludge containing particles of rubber which have previously passed through a 60-mesh screen

Collyer on Defense Needs

The B. F. Goodrich Co., Akron, on January 23 held a regional conference at Park Central Hotel, New York, N. Y., for district and executive staffs and salesmen from its New York, Boston, Albany, Washington, and Philadelphia districts. President John L. Collyer, in his address, was optimistic about the 1941 outlook for the rubber industry, also foreseeing a tire replacement sale of 37 million units, about two million above the 1940 figure, and he further declared that during the past six months Goodrich had received more than ten million dollars worth of direct government orders of the many millions placed with the rubber industry. Products supplied by Goodrich include airplane de-icers, tracks for tanks and scout cars, self-sealing fuel tanks, tires, and mechanicals as vibro-insulators, belting, and hose.

Mr. Collyer warned that this nation's ability to reach self-sufficiency in rubber depends upon the speed with which it creates productive capacity for the new synthetic varieties. From Goodrich's experience with the synthetic Ameripol and tires made of it, which are giving satisfactory service and meeting with good favorable response from the public, Mr. Collyer feels that from 18 to 24 months would be required for the creating of a standby industry. And with 97% of our crude rubber coming from the Far East every precaution must be taken to insure that a customary supply be maintained to carry out our national defense program. The speaker further stated that in most instances the rubber industry has ample productive capacity to keep abreast of the anticipated greater demand without the need of priorities, at least for some time to come.

Mr. Collyer was accompanied by J. J. Newman, vice president in charge of tire sales; C. B. O'Connor, general sales manager for tires; J. A. Hoban, tire merchandising manager; C. T. Morledge, manager automobile tire sales; J. E. Powers, truck and bus tire sales manager; Guy Gundaker, Jr., budget sales manager; and E. D. Nathan, sales promotion manager.

The Pharis Tire & Rubber Co., Newark, on its own initiative recently communicated with necessary Governmental agencies and the Newark Board of Education in order to cooperate in the United States Government's call for defense training to enable more men to enlist as skilled labor in industries requiring them. Thus on January 7, under the guidance of O. A. Helser, personnel director at Pharis and supervisor of its defense training program, ninety men, all Pharis employes to whom the plan is restricted, but without cost, began attending classes in pipe fitting, sheet metal, drafting, electrical, welding, and machinists. All classes are conducted in the Pharis machine shop, on a ten-hour week schedule, except for the drafting course, being given at the local high school.

Holt on the Current Rubber Situation

Everett G. Holt, chief, Leather and Rubber Division, United States Department of Commerce, Washington, D. C., on December 12 addressed the Akron Export Club and the Akron Chamber of Commerce on "The Current Rubber Situation Calls for National Viewpoint." He referred to his talk there two years ago when he advised preparing for and adapting ourselves to coming world changes.

In mentioning the government's interest in export trade and the subjecting of many products to license, Mr. Holt reminded his listeners of what was said at the State Department to members of the crude rubber trade before licensing was made effective there that, "If you receive orders for unusual business from unusual customers abroad, you should consider whether that business is for the best interests of the nation and not merely consider profits and losses of your company."

Reclaimed rubber is still our first-line defense in the matter of rubber supplies, and Mr. Holt urged wider use of reclaim to conserve crude rubber supplies and emphasized the point that reclaimed rubber has been our chief past contribution to world supplies of raw materials.

Stressing more tire retreading, he said that the volume of such business grew steadily from 1929 through 1939, but last year with greater emphasis on low-priced new tires, retreading in the United States had dropped.

As an indication of optimism regarding lower-cost synthetic rubbers, Mr. Holt said he understood that butadiene ordinarily is obtained from crude petroleum to the extent of ½ to ¾ of 1% of the raw material under ordinary cracking methods in the production of motor fuel, but that a recently developed method recovers about 5%. Besides chemical companies, in the past largely responsible for the development of the synthetic, the greater number of oil companies presents fields for greater output of the material with a resulting decrease in cost.

Rubber reserve stocks in the U. S. also were dealt with by the speaker. He mentioned increased quotas, the cotton-rubber barter agreement,[1] and those of the Rubber Reserve Co.[2] Mr. Holt believes that shipments to this country, at an estimated 810,000 tons in 1940, will be much higher in 1941, probably 900,000 tons, but again increased consumption will cut into stocks.

The industry is more and more becoming a public utility industry acting for the welfare of the general public, and this is indeed true of every big industry in the country. The rubber industry is, and has been, doing its part —in the stock accumulations program; in synthetic rubber expansion; and in the standardization of tires, which in the reduced demand for molds frees machinists for the production of more essential war materials. But it needs to do more in the way of conservation, especially by using more reclaimed rubber.

The national viewpoint is necessary in the conduct of business. National thinking, national planning, national cooperation, national action, national unity, and national confidence are all essential for real strength. Such was the underlying thought of Mr. Holt's address.

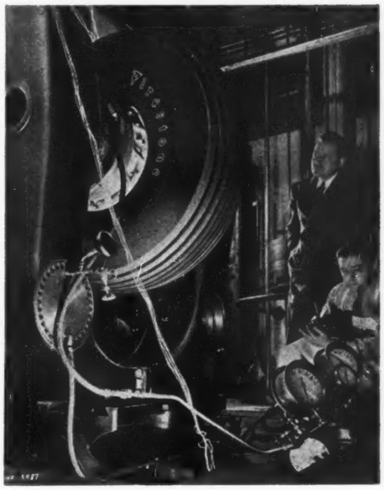
[1] For details see INDIA RUBBER WORLD, July 1, 1939, p. 74.
[2] *Ibid.*, Aug. 1, 1940, pp. 42, 44; Sept. 1, 1940, p. 49.

Firestone News

John W. Thomas, president of the Firestone Tire & Rubber Co., Akron, in addressing the recent annual stockholders' meeting, emphasized the need of an intensified production effort and more toil and sacrifice on the part of all elements in our national life. He further declared that the Firestone company was expanding its facilities as rapidly as possible and that every plant was working at capacity to fill orders from the Government and also to take care of customers. The recently completed plant for manufacturing synthetic rubber is now on a commercial basis, and the company plans to double capacity this year. Among the important products listed by Mr. Thomas as being manufactured for the national defense program are: tires, tubes, and rims for motor vehicles and airplanes; tank blocks and bogey wheels for army tanks; bullet-sealing fuel tanks for planes and mechanized equipment; bullet-resisting tubes; gas masks; plastic lenses; rubber pontoons; seadrome lighting buoys; shell guard facings and metallic clips for machine guns.

Firestone, according to W. Shaw, manager of the aeronautical sales division, for the third consecutive year sponsored the world's only air race for light planes as part of the Thirteenth Annual All-American Air Maneuvers at Miami, Fla., on January 10 to 12. A cash prize and the Firestone trophy were given into the permanent possession of the winner of the final race, and other cash awards went to the next three pilots to finish.

Mrs. Harvey S. Firestone, Sr., has composed a new theme song, "If I Could Tell You," to take the place of her "In My Garden" on the Voice of Firestone radio program. It was sung for the first time on the air on January 6 by Richard Crooks.



Wilbur Shaw viewing a 17.00-16 Airplane Tire after Test

Tire Tester

In the testing laboratories of the Firestone company is a machine (illustrated) that subjects airplane tires to a series of simulated landing tests. The tester will handle tires up to 65 inches in diameter that normally carry a load of 32,500 pounds. Taking place of the outdoor runway is a rotating solid steel wheel with a roughened surface, against which the tire under different conditions of load and inflation is jammed by a hydraulic cylinder. A brake is applied to the tire to halt the rotating steel wheel.

The machine is set up so that the wheel, acting as a flywheel, has stored-up energy equal to that supported by the tire at landing speed. Other adjustments are made for the angle of glide, the impact at landing, and the time the plane taxies before brakes are applied. During test, instruments record speeds, braking pressure, power absorbed by brakes, distance the plane would have traveled, and the temperature throughout the tire, wheel, and brakes at every instant of test. From the data obtained tire design engineers can learn where improvements can be made.

Goodyear Forms New Company to Make Powder Bags for U. S.

The Goodyear Tire & Rubber Co., Akron, recently organized The Goodyear Engineering Corp., which has been awarded the contract for the management and operation of a powder bagging plant for the Ordnance Department of the United States Army. The new concern will be independent of Goodyear's tire and rubber manufacturing and sales activities, but will draw upon its personnel and manufacturing experience for the engineering company's basic staff and efficiency of plant layout. Paul W. Litchfield, chairman of the rubber company, heads the new organization.

Among the 31 men already assigned to duties at the new company are: Roland H. Gray, of Decatur Mills, Ala., who has been named resident manager; W. R. Urquhart, consulting engineer; Harold R. Child, superintendent; A. N. Soderstrom, chief engineer; C. E. Jordan, works accountant; W. L. Tinney, cashier; A. F. Novick, who returned last year from Sweden, assistant superintendent; Charles Blythe, personnel, and Harry Walker, safety.

The new plant, owned by the government and known as The Hoosier Ordnance Works, will be located on a 3,000-acre tract at Charlestown, Ind., conven-

ient to a large new government powder plant which will supply the powder for the loading plant. The government will furnish the material for the bags which will be both fabricated and loaded by the Goodyear subsidiary. Such bagged explosives are used as the propelling charge for large guns.

Scheduled Plane Production

An announcement last month stated that the Chrysler Corp., the Glenn L. Martin Co., and Goodyear in a joint manufacturing program would produce 100 bombing planes a month under national defense plans. Details were not revealed, but the assembly of parts after processing is believed will take place in a new plant in Indiana. Goodyear, through its aircraft division, has considerable equipment and experience for such work.

Sales Conferences

On January 20 at the Copley-Plaza Hotel, Boston, Mass., more than 150 of Goodyear's New England tire dealers attended a conference at which speakers were Mr. Litchfield; E. J. Thomas, Goodyear president; and R. S. Wilson, vice president and sales manager. Topics discussed were the company's activities in national defense, sales plans, and the outlook for 1941 business. Shown was the company's latest motion picture, "Goodyear Shoulders Arms," a dramatic presentation of industry's place in defense. Another feature of the meeting was a display of war materials made by the company, including: bullet-proof gasoline hose and tanks, bullet-seal tubes, rubber boats and flotation bags to keep planes afloat on water in case of forced landing, bombing plane control surfaces, gas masks, fire and decontamination hose, tank treads, airplane tires, hydraulic brakes, and other plane parts, life vests, and Chemigum, as well as a number of ordinary products which are adaptable to defense needs, as tires, Airfoam, and conveyer belting.

The sales conference with the defense products exhibit and motion picture showing moved to the Waldorf-Astoria Hotel, New York, on January 22. Mr. Litchfield in his address stated that the national defense program came before anything else and that the rubber industry will be able to meet all the demands put upon it. He also stressed the need of increased aid to Britain and mentioned that his company is sending large amounts of fire hose to England so that deliveries on ordinary domestic orders now require three months. Company officials further believe that a major portion of regular machinery used by the industry can be converted into use for defense purposes. Consequently Goodyear is endeavoring to standardize as much as possible necessary equipment, as for instance, rims for military tires to expedite tire output.

New Additions at St. Marys

Construction of two large additions to the molded mechanical goods plant of the St. Marys Mfg. Co., St. Marys, O., Goodyear subsidiary, will start within the next month, according to I. D. Patterson, resident superintendent. One addition will be 50 by 500 feet, part of which will be two stories high, on the east side of the present plant. The other addition will be two stories throughout, 80 by 250 feet, on the south side of the plant. These additions will add approximately 50% to the existing capacity of the plant and, together with equipment, will cost about $300,000.

C. W. Seiberling, vice president and co-founder of the Seiberling Rubber Co., Akron, and president of Seiberling Latex Products Co., Barberton, who celebrated his eightieth birthday on January 26, was honored on January 24 at a huge party held at East Market Garden, Akron, and attended by friends, relatives, and Seiberling employes. He has been connected with the rubber industry since 1895, when he and his father organized the Akron India Rubber Co.

Wilson Rubber Co., manufacturer of rubber gloves, finger cots, drainage tubing, dilator covers, etc., Canton, this year celebrates its twenty-fifth anniversary.

Textile Rubber Co., manufacturer of molded and extruded rubber goods, automobile, bicycle, and toy parts, Akron, according to Secretary-Treasurer C. M. Keitt, is moving its plant from Banning, Ga., to larger quarters at Bowdon, Ga., where operations will be started early in February in the production of such products as handle-bar grips, pedal rubbers, and electrical and automotive rubber items. The new main building is 50 by 170 feet, with boiler room and reservoir in the rear. About 50 employes will be hired.

The Dill Mfg. Co., Cleveland, according to President A. P. Williamson, appointed Wm. C. Holmes, effective January 20, sales manager to succeed the late Louis F. Body. Mr. Holmes joined the company in 1929 as Pacific Coast representative and manager. An alumnus of William Jewel College. Mr. Holmes previously had been with the Goodyear Tire & Rubber Co., Akron, and for five years was in charge of sales operations in Brazil.

The Timken Roller Bearing Co., Canton, O., last month named M. C. Bellamy, who had been sales engineer of the Seattle office since 1934, district manager of industrial bearing and steel sales for the Seattle territory. A graduate of Purdue University, Mr. Bellamy joined Timken in 1928 after several years in other industrial capacities. After two years in the Timken plant and engineering department he was made sales engineer.

John M. Miller

NEW ENGLAND

Factory Executive

John M. Miller, assistant factory manager at the Providence, R. I., plant of the United States Rubber Co., has a long and creditable career in the rubber industry. He started with the Firestone Tire & Rubber Co., Akron, O., in February, 1920, and by 1924 was superintendent of the Firestone Steel Products Co. Two years later Mr. Miller became superintendent of the Firestone Footwear Co., Hudson, Mass. Then in 1936 he returned to the Firestone Tire & Rubber Co. as superintendent of its mechanical goods division in Akron. After two years he was made superintendent of the Firestone Rubber & Latex Products Co., Fall River, Mass. Early last year he secured his present post.

Mr. Miller was born in Clinton, Ill., December 8, 1894. He attended local grade and high schools and the University of Notre Dame, where he majored in mechanical engineering, distinguished himself in athletics, and was graduated with the Class of 1917. Then began his war service as a lieutenant of infantry.

Mr. Miller, whose hobbies are golf and fishing, belongs to the Quequechan and Acoaxet clubs.

He is married and has two sons and a daughter.

Warwick Chemical Co., West Warwick, R. I., through President Ernest Nathan, has announced that Parke Masters has joined its sales force and will have headquarters at Boston, Mass. He was formerly with the R. & H. division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and, previously, for many years with the Joseph Turner Co., Richfield, N. J. The F. W. Schill Co., Cleveland, O., has been appointed distributer for the Cleveland and nearby territory for the metallic stearate department of Warwick Chemical.

Harry L. Fisher, of the research laboratory of U. S. Industrial Chemicals, Inc., 41 Magee Ave., Stamford, Conn., on January 10 addressed the Hudson County Dental Association in Jersey City, N. J., on "Rubber and Modern Plastics."

Robert C. Kelley, purchasing agent of the Converse Rubber Co., Malden, Mass., has been named to the 1941 Students' Contest Committee of the National Association of Purchasing Agents, Inc., 11 Park Place, New York, N. Y. Mr. Kelley was chairman of the final judging committee for the 1940 contest, another member of which was Ralph D. Berry, of the Davol Rubber Co., Providence, R. I.

MIDWEST

Monsanto Pension Plan

Monsanto Chemical Co., St. Louis, Mo., recently inaugurated a pension plan so that when its employes who have had at least ten years of service with the company retire (women normally at the age of 60; men, 65), the amount of pension, when combined with governmental pensions, will approach 50% of average earnings for workers of long service earning less than $3,000 a year. Those making under $250 a month participate in benefits without cost; employes receiving more than that sum to receive a pension commensurate with their earnings can contribute 4½% of their earnings above $3,000 a year, but are automatically included for that portion of their annual earnings under $3,000. Special provisions have also been made for earlier retirement under certain conditions at a reduced pension. To maintain an adequate income at retirement age for its workers, Monsanto will increase pensions should government pensions be lowered, and vice versa. All employes, male (between the ages of 30 and 65) and female (between 25 and 60), of Monsanto's domestic plants, offices, and subsidiaries are included under the plan.

New Chemicals Plant

To meet the demands of the government for chemicals needed in making munitions, Monsanto is erecting adjacent its present establishment at Monsanto, Ill., a new chemical plant, for which the government will pay and will also retain title to the buildings and installations. Monsanto has leased the site of the plant to the United States without charge. By special request of Monsanto the plant will be operated and its products furnished to the government at cost and without any profit for the manufacturer.

Thomas S. Carswell, director of plastics research for Monsanto, recently disclosed that the company has launched a program to study uses for plastics materials to free strategic metals for defense needs. Already in use are molded plastics for housings of all types, notably for scales, business machines, radios, vacuum cleaners, and other appliances; kitchen utensils; flashlight and camera cases; measuring scoops; automobile parts; and for freezer doors, panel and drawer fronts, and knobs and control panels for electric refrigerators.

Executive Changes

John W. Livingston, Monsanto vice president and co-general manager of the organic chemicals division, last month announced several promotions in the division, which includes plants at Monsanto, Ill., St. Louis, Norfolk, Va., and Nitro, W. Va., necessitated because increasing activity in operations required additional management supervision. Daniel S. Dinsmoor, manager of the Monsanto, Ill., plant has been transferred to St. Louis as assistant general manager of the organic chemicals division and is succeeded at the Monsanto plant by Wm. G. Krummrich, manufacturing superintendent there. Mr. Krummrich next announced that Samuel Cottrell, assistant manufacturing superintendent, had been named manufacturing superintendent for inorganic chemicals, and that Robert M. Sanford, supervisor, had been appointed to the similar post for organic chemicals. Paul Tompkins, assistant supervisor of the Phenol department, has been made assistant to the plant manager.

General Manager R. R. Cole, of the phosphate division, has reported the appointment of Dr. Russell L. Jenkins, assistant director of research of the organic chemicals division, to the post of director of research for the phosphate division. Dr. Jenkins has been transferred from St. Louis to the phosphate division's laboratories in Anniston, Ala. His successor in the organic chemicals division is the group leader in the research department, Dr. Richard M. Hitchens, reported Dr. L. P. Kyrides, research director for the division.

Auburn Rubber Corp., Auburn, Ind., won three awards at the recent Eighth Annual "5 & 10" Packaging Contest. The Auburn play hammer and play hatchet won the award for "Greatest Merchandising Value Gained from Packaging Design" in the Stationery and Toy Division; in the same division the prize for "Best Use of Materials" went to Fix-Fast Rubber Cement; and a white rubber spatula with a red handle and a cellophane wrapper won the "Greatest Counter Display Value" prize in the Hardware and Household Products Division. Martin Ullman designed all three packages. This packaging contest is sponsored by the *Syndicate Store Merchandiser,* 79 Madison Ave., New York, N. Y., and precedes the annual "5 & 10" Packaging Show & Conference, which this year will take place at the Hotel Astor, New York, March 12 to 14 and will feature discussions of packaging, shipping, display, and allied topics.

Thirty-one rubber companies in the Midwest recently paid 15,323 employes $382,000 in wages, respective gains of 1.6% and 3.1% over the previous month.

CANADA

Outlook for '41

Canadian rubber manufacturers, working at capacity to fill government orders as well as ordinary consumer needs and with staffs that have been frequently reduced by the recruiting of man power for military purposes, expect 1941 to be about the same as 1940, a year of considerable activity as well as great anxiety. This year should also witness the ever-increasing capacity of existing plants manufacturing war materials and new plants coming into production, all of which require rubber products in one form or another. One problem is to maintain an adequate supply of crude rubber despite the precarious situation in the Far East. The war also has curtailed exports although the rise in domestic demand because of increased industrial activity and orders from the government to fill Empire needs has to a large extent offset this loss.

Since the outbreak of the war the cost of raw rubber delivered in Canada has risen about 40%; while other major raw materials used in the rubber industry, as cotton, also have materially advanced in price. However increased volume of production has enabled the industry to maintain prices at less than 10% above pre-war levels, exclusive of additional excise taxes.

Last year tire companies in the Dominion manufactured more than 2,500,000 tires for ordinary domestic and export distribution, about the same as in 1939, and were also able to supply tires of military type. Tire exports decreased by 370,000 units, but domestic tire sales, apart from the military, rose by 390,000.

The Canadian rubber industry has been making for the Dominion and the British Government such articles as hose, gas masks, ground sheets, surgical and hospital supplies, booths for the army and navy, rubber parts for trucks, planes, and gun mounts, as well as tires of both conventional and military types. More than 500 miles of fire hose and much good hose have been manufactured in Canada and shipped to Britain during the last three or four months.

Rubber manufacturers and the Canadian government are said to have in warehouses, afloat to Canada and under contract for near future delivery around 32,000 long tons of crude rubber or about one year's normal consumption.

Dr. Bryce Stewart, Deputy Minister of Labor in the Dominion Government, estimates that by the year-end the number of employes engaged in the manufacture of tires for military vehicles will be 2,200, against the present 1,800.

The Dominion Department of Munitions and Supply, Ottawa, Ont., recently awarded contracts to the following: Kaufman Rubber Co., Ltd., Kitchener, Ont., $26,000; Dominion Rubber Co., Ltd., Montreal, P. Q., $8,417; and Rubberset Co., Ltd., Gravenhurst, Ont., $9,263.

Reconditioned golf balls are now available from a Toronto professional golfer, who has put out a call for 25,000 balls. By a special process he removes the old paint from the ball without damage to it and then applies a special wear-resisting paint. The market price for old balls runs from 50 to 60¢ a dozen, but the renovator may be able to use only three or four of the twelve. After treatment the balls may be sold for 25¢ each.

Canadian Pulp & Paper Association held its annual meeting at Montreal, P. Q., January 29 to 31. Dr. Howard E. Fritz, head of the Koroseal Division, The B. F. Goodrich Co., Akron, O., U. S. A., addressed the technical session, discussing "Synthetics."

Albert M. Collins, former superintendent of the shoe-cutting department of Gutta Percha & Rubber, Ltd., Toronto, Ont., who had been with the company nearly half a century, died last month, and funeral services were held in Toronto on January 6.

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., according to President R. J. Thomas, has received a substantial order from the government which is keeping the plant running 24 hours a day, seven days a week. Directors believe the company will receive enough additional orders to operate at full capacity until the year-end at least.

Fred C. Irwin, purchasing agent of the Canada Wire & Cable Co., Ltd., Toronto, Ont., and a member of the executive committee in charge of membership eligibility of the National Association of Purchasing Agents, Inc., 11 Park Place, New York, N. Y., has been named a member of the N. A. P. A. Students' Contest Committee for 1941. He served in a similar capacity last year.

The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has appointed Sydney R. Skelton manager of the advertising department. He joined the company five years ago after working for an advertising agency in Toronto. President A. G. Partridge, in his letter accompanying quarterly dividends to stockholders stated sales in 1940 increased over those of 1939 and net earnings covered all dividend requirements, but the increased business did not show the usual percentage of profit for the year.

At the request of employes at the Bowmanville, Ont., plant, Labor Minister McLarty established a board of conciliation and investigation under the Industrial Disputes Investigation Act to deal with difficulty which has arisen in respect to recognition of the union, wages, and working conditions.

OBITUARY

L. O. Guinther

ON DECEMBER 29, Lawrence O. Guinther, manager of the airplane tire sales division of the Goodyear Tire & Rubber Co., Akron, O., died after a long illness. He was born in Galion, O., 46 years ago. After his graduation from Wooster College in 1916, he joined the field artillery service of the United States Army and later transferred into the air service where he was a military observer. He had been flying since 1918 and was said to be the oldest in point of service among the tire salesmen in the airplane industry.

Mr. Guinther also belonged to the Quiet Birdmen, the American Legion's Aviation Post of New York City, the Masons, and Alpha Tau Omega. He was, moreover, an official of all The National Air Races held in the United States.

He leaves his wife, a daughter, two brothers, and a sister.

Funeral services were held in Akron on December 31 with burial in Galion. Pallbearers included: Major James H. Doolittle, of the U. S. Army; Howard F. Rough, assistant director of aeronautics, U. S. Department of Commerce; Clarence O. Bell, chief pilot for Goodyear; V. R. Jacobs, manager of government sales and aeronautics at Goodyear; and H. W. Maxson, director of public relations, The B. F. Goodrich Co.

Stephen Louis

STEPHEN LOUIS, assistant treasurer of Monsanto Chemical Co., St. Louis, Mo., since 1929, died January 9 at a hospital in St. Louis after a prolonged illness. He was born February 29, 1880, in France and came to the United States when 18. Then he taught several years in a French school in Louisiana. Next he moved to St. Louis and was employed by the City of St. Louis and the Ely & Walker Dry Goods Co., joining Monsanto in 1917.

Mr. Louis was unmarried and is survived by his mother and three sisters in France.

J. A. Lobraico

JOSEPH A. LOBRAICO, 50, well-known tire merchant of Toronto, Ont., Canada, died suddenly on December 21. For 20 years he had been in the tire business, first as district manager of the Seiberling Rubber Co. of Canada, Ltd., Toronto, and for the past 14 years as head of his own firm. He was also a member of the Toronto Board of Trade and in his youth was a noted athlete.

William J. Kelly

WILLIAM JAMES KELLY, well-known research chemist, died in Philadelphia, Pa., on December 30 from a heart condition. He was born in Boston, Mass., on January 18, 1888, and was educated at the local public schools, Massachusetts Institute of Technology (B. S., 1909), and University of Leipzig (Ph.D., 1913).

He did research work in the General Laboratories of the United States Rubber Co., in New York, N. Y., for a year and in 1914 joined the Standard Oil Co. of New York as research chemist. In 1918, Dr. Kelly took a research position with the Goodyear Tire & Rubber Co., Akron, O., and while there took out several chemical patents and published many papers relating to his work. During this time he developed new analytical methods for determining the sulphur in rubber and the coefficient of vulcanization in rubber and received patents on the manufacture of mercaptobenzothiazol. In July, 1927, he resigned to accept a position as research chemist and later as a patent agent also with Rohm & Haas Co., Philadelphia, manufacturer of chemicals and resins. One of his developments there was hard rubber separators for storage batteries.

The deceased belonged to the American Chemical Society and was also an organizer and former secretary of the Akron Section, was vice chairman, then chairman and later executive committee member and councillor of the Philadelphia Section, and at one time was a member of the Akron University and Portage Country clubs and, recently, the Penn Athletic Club.

His wife and a daughter survive him. Funeral services were held in Philadelphia on January 2. Interment took place in Boston.

Josiah Hollies

JOSIAH HOLLIES, one of the three founders (July 14, 1881) of the now-defunct Globe Rubber Co., Trenton, N. J., died there on December 31 after a lengthy illness. He was also a past treasurer of the Trenton Malleable Iron Co.

Born in England 83 years ago, Mr. Hollies came to Trenton when a young man and attended a local business college. He was long affiliated with the Trenton Episcopal Cathedral.

Burial was in Riverview Cemetery, Trenton.

Survivors include the widow, a daughter, and four sisters.

M. H. MacKusick

WORD was received late last month that on December 5, M. H. MacKusick died after a short illness. He was managing director of Northwestern Rubber Co., manufacturer of reclaimed rubber, Litherland, Liverpool, 21 England. He was a most important factor in the company since 1924, when it was reorganized.

David Milne

DAVID MILNE, for 21 years machine shop superintendent of Farrel-Birmingham Co., Inc., Ansonia, Conn., died of a heart attack at his home in Milford, Conn., on December 25, 1940. He was born in Montrose, Scotland, September 30, 1878, and served his machinist apprenticeship at the Chapel Works there, then in 1900 went to Canada as a machinist in a railroad locomotive plant. He came to the United States and in 1907 became a vertical boring mill operator at the Farrel Foundry & Machine Co. In 1916 he was made a foreman and in 1920 superintendent of the machine shop.

Mr. Milne was a member of the Congregational Church in Milford; George Washington Lodge, F. and A. M., Ansonia; Milford Chapter, Royal Arch Masons; Orange Council, R. and S. M.; Lucia Chapter, O. E. S., Milford; Milford Court, Order of Amaranth; the Foremen's Club of the Lower Naugatuck Valley; and the Veterans' Association of Farrel-Birmingham Co.

He is survived by his wife, two daughters, a son, a sister, two brothers, and four grandchildren.

Funeral services were held on December 28, with interment in King's Highway Cemetery, Milford.

George M. Brooks

FOLLOWING a long illness George Murray Brooks, general counsel, executive vice president, and a director of the Okonite Co., Passaic, N. J., died on January 1 at a New York hospital. He had joined the company in 1882 and had been a vice president for more than two decades; he was also a vice president and a director of the affiliated organization, Okonite Callender Cable Co., Inc., Paterson, N. J.

Mr. Brooks was born in Dalton, N. H., 83 years ago. Graduated from the Yale Law School in 1879, he engaged in private practice for many years.

He leaves a wife.

Wm. P. Pickhardt

PNEUMONIA caused the death, on January 22, of Wm. Paul Pickhardt, long identified with industrial and chemical engineering and a director and officer of many chemical and plastics concerns including General Dyestuff Corp., New York, N. Y., Unyte Corp., and Plaskon Co., Inc., Toledo, O. Born in New York, January 8, 1881, he was educated at Gymnase Cantonale de Neuchatel, Switzerland, and Columbia University, New York (B.S. in chemistry, 1901). Then he went to work for his father's firm, which imported and manufactured dyes and chemicals. Advancement followed and continued even after the company was merged with other organizations. Other affiliations came later.

A bachelor, Mr. Pickhardt leaves his mother, two brothers, and three sisters.

Funeral services were conducted on January 24 at the Lutheran Church of the Holy Trinity, New York.

Preston Crowell, Jr.

INJURIES received in an automobile accident caused the death, on January 8, of Preston Crowell, Jr., sales representative of The B. F. Goodrich Co. in Washington, D. C. He had joined the company in 1929 as a truck and bus tire salesman in Harrisburg and was later transferred to Philadelphia and then to Washington. In 1936 he was made Goodrich Silvertown Store manager in Norfolk, Va., and the next year received the Washington assignment.

Mr. Crowell was born in Cumberland, Md., 49 years ago and attended local public schools and Carnegie Institute of Technology.

Survivors include his wife and two children.

Funeral services were held in Washington on January 10, with interment in Harrisburg, Pa.

FINANCIAL

Company Reports

Unless otherwise indicated, the results of operations of the following are after operating expenses, Federal income taxes, and other deductions. Additional tax charges under the new Revenue Act of 1940 have been made against earnings in many reports. Figures in most cases are subject to audit and final adjustments.

Baldwin Rubber Co., Pontiac, Mich. Fourth quarter, 1940: net profit, $208,-586, equal to 66¢ a share on 315,754 shares of $1 par common stock, against $160,678 or 51¢ each on 316,757 common shares in the same quarter of 1939. Six months to December 31: net profit, $290,061 or 92¢ cents a share. Owing to change in fiscal year to end June 30, no comparison with 1939 is available.

Dayton Rubber Mfg. Co., Dayton, O. Year ended October 31: net profit, $518,-897, equal after preferred dividend requirements, to $2.41 a share on the outstanding common stock, against $783,582 or $3.91 a common share in the previous year.

General Tire & Rubber Co., Akron, O., and subsidiaries. Year ended November 30, 1940: net profit, $595,917, equal, after all charges, federal income taxes, and preferred dividends, to 86¢ a share on 526,847 common shares outstanding, against $2,137,318, or $3.77 each on 526,427 common shares, for the preceding fiscal year; net sales, $22,214,-314, against $24,048,829.

Hercules Powder Co., Inc., Wilmington, Del. For 1940: net earnings, $5,-807,769, equal, after all charges including excess-profits taxes, and $524,928 of preferred dividends, to $4.01 each on 1,316,-710 shares of common outstanding, against $5,342,992, or $3.65 a share, in 1939; capital expenditures, $4,342,000, against $4,981,000 in 1939; net sales, $52,429,191, a new high, against $41,009,-861.

Lee Rubber & Tire Corp., Conshohocken, Pa. Year ended October 31, 1940: consolidated net profit, $981,887, equal, after all charges, taxes, and appropriation for inventory valuation reserve of $450,000, to $3.66 a share on the 268,343 capital shares outstanding, against $1,464,166, or $5.46 a share, in the preceding fiscal year; consolidated sales, after payment of excise taxes, $13,-966,771, the highest on record and contrasted with $13,938,545 the year before; current assets, $8,057,417 including cash of $2,235,652; current liabilities, $1,389,-507; for preceding fiscal year the respective figures were $7,794,674, $2,865,150, and $1,525,877.

Pharis Tire & Rubber Co., Newark, O. Year to October 31: net profit, $13,-812, equal to 6¢ each on 220,000 shares of $1 par capital stock, against $499,123, of $2.27 a share in the previous fiscal year; net sales, for the year to October 31, 1940, $5,542,744.

Rome Cable Corp., Rome, N. Y. Fourth quarter, 1940: unaudited net profit, $107,513, equal to 57¢ each on 189,830 capital shares, against $100,755, or 53¢ a share in the preceding quarter, and $102,216, or 54¢ cents a share in the December quarter of 1939. Nine months to December 31: net profit, $268,838, or $1.42 a share, against $217,300, or $1.14 a share, for the nine months to December 31, 1939.

Russell Manufacturing Co., Middletown, Conn. Eleven months ended October 31: net income, $182,790; net sales, $3,950,078.

Seiberling Rubber Co., Akron, O. Year ended October 31, 1940: net income, $219,488.76 after all charges, adjustments, and provisions for taxes, against $828,791.74 in the year ended October 31, 1939; net sales, $9,609,826.35, against $9,328,467.70; cash on hand and in banks, $591,588.48; current assets, $4,142,312.41; current liabilities, $1,203,-943.55; net worth of the company, $5,-242,250.96.

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., Canada. Year ended October 31, 1940: net profit, after all charges, $28,216, equal to 89¢ a common share, against $31,397, or $1 a share, in the previous fiscal year; earned surplus, $72,481, against $31,397; current assets, $947,599; current liabilities $1,176,626; deficit in working capital, $229,027, against $255,864 at the preceding fiscal year-end.

New Incorporations

Air-Lift Rubber Corp., New York. Capital $10,000. Garey & Garey, 68 Wall St., New York, N. Y. Rubber heels.

Antiseptics, Inc. Capital 100 shares,

no par value. Levy, Gutman & Goldberg, 363 Seventh Ave., New York, N. Y. Rubber products.

Baron-Klein Rubber Corp., Bronx, N. Y. Capital $10,000. I. Jacobskind, 302 Broadway, New York, N. Y. Rubber products.

British American Raincoat Corp., New York, N. Y. Capital 500 shares, no par value. Rosen & Goldman, 122 E. 42nd St., New York. Raincoats.

Eagle Air Cushion Heels, Inc., New York, N. Y. Capital $10,000. G. E. Daniels, 36 W. 44th St., New York. Rubber heels and soles.

Ell-Tex Co. of America, Inc., 39 Central Ave., East Newark, N. J. Capital 2,500 shares, no par value. J. Cohen, 59 Pennsylvania Ave., Brooklyn, A. Meyer, 277 West End Ave., and J. Meyer, 230 Central Park West, both in New York, all of N. Y. Manufacture rubber gloves and other rubber products.

Empire Shield Co., Inc., New York, N. Y. Capital $150,000. Herwood, Paris & Herwood, 521 Fifth Ave., New York. Rubber products.

Frena Trading Co., Inc., New York, N. Y. Capital 200 shares, no par value. R. Loeb, 52 Wall St., New York. Leather, skins, rubber.

Gulf Rubber Co., Inc., New Orleans, La. Capital $100,000. E. D. Levy, president; S. Diefenthal, secretary; and G. T. Duke, treasurer.

Harris-Noll Products Corp., New York, N. Y. Capital $20,000. I. F. Becker, 233 Broadway, New York. Elastic products.

Keystone Tire Corp., Bronx, N. Y. Capital 200 shares, no par value. Filardi & Caruso, 175 Main St., White Plains, N. Y. Rubber accessories.

Lajone Rubber & Mfg. Co., 3236 W. 31st St., Springfield, Ill. Capital 100 shares, no par value. N., I., and N. Lajone, Jr. Rubber goods.

Latexture Products, Inc., New York, N. Y. Capital 25 shares preferred stock and 175 shares, no par value. H. Rappaport, 270 Broadway, New York. Rubber and latex products.

Monroe Rubber & Packing Corp., Rochester, N. Y., consolidation of Monroe Rubber & Packing Corp. and Stand Pat Easel Corp. Capital $40,000. Weldgen, Newton & Morgan, 400 Terminal Bldg., Rochester. Rubber, leather, and paper products.

National Lockair, Inc., Dover, Del. Capital 1,000 shares, no par value. A. M. Kreidman, D. E. Newman, and M. L. Cianci, all of New York, N. Y. Rubber products.

Paragon Rubber Cement Corp., Queens, N. Y. Capital 100 shares, no par value. M. Greenberg, 299 Broadway, New York, N. Y. Rubber cement.

Pneumatic Valve & Specialty Co., Inc., 4037 Sheffield St., Hammond, Ind. Capital 1,000 shares of $25 par value. L. L. Powell, 7217 Harrison St., Hammond. Manufacture and sale of pneumatic rubber pipe line stoppers, bow-facing oar locks, and other specialties.

Red Bank Rubber Co., Red Bank, N. J. Capital 100 shares, no par value. Agent C. Jones.

Rubber & Plaster Compound Co., Inc. (New York). Capital $5,000. Debevoise, Stevenson, Plimpton & Page, 20 Exchange Pl., New York, N. Y. Rubber and plastics.

Rubber-Latex Products, Inc., Akron, O. Capital 300 shares, no par value. P. C. Weick, K. A. Mason, and E. W. Barnes.

Scot Rubber Corp., 5816 Lowe Ave., Springfield, Ill. Capital 100 shares common stock, no par value. E. Huebsch, M. M. Ruebach, and H. Kalowski. Rubber goods.

Steiff Rubber Mfg. Co., Inc., Roxbury, Mass. Capital 100 shares, no par value. F., H., and I. Steiff.

Synthetic Rubber Products Corp., Dover, Del. Capital $100,000. C. B. Bishop, J. H. Dallett, and A. B. Phillips, all of Wilmington, Del. Deal in synthetic rubber and its products.

Uland-Davis Rubber & Supply Co., Louisville, Ky. Capital $10,000. H. and A. Uland and E. Davis.

Union Asbestos & Rubber Co., 148 Market St., Paterson, N. J. Capital $250,000. J. Paer, 148 Market St., S. Levine, 465 E. 24th St., and L. Roemer, 54 17th Ave., all of Paterson. Manufacture all kinds of asbestos and rubber goods.

Velveton Rubber Heel Corp., Queens, N. Y. Capital $20,000. H. L. Burston, 11 W. 42nd St., New York, N. Y. Rubber heels and soles.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Cork Co.	Com.	$0.25 interim	Mar. 3	Feb. 3
Armstrong Cork Co.	Pfd.	$1.00 q.	Mar. 15	Mar. 1
Crown Cork & Seal Co., Ltd.	Com.	$0.50 q.	Feb. 15	Jan. 31
Detroit Gasket & Mfg. Co.	Pfd.	$0.30 q.	Mar. 1	Feb. 15
DeVilbiss Co.	Com.	$0.50 irreg.	Jan. 15	Dec. 31
DeVilbiss Co.	Pfd.	$0.175 q.	Jan. 15	Dec. 31
Firestone Tire & Rubber Co.	Com.	$0.25	Jan. 20	Jan. 4
Firestone Tire & Rubber Co.	Pfd.	$1.50 q.	Mar. 1	Feb. 15
General Cable Corp.	Pfd.	$1.75 accum.	Jan. 31	Jan. 27
Lee Rubber & Tire Corp.	Cap.	$0.75	Feb. 1	Jan. 15
Lee Rubber & Tire Corp.	Cap.	$0.40	Feb. 1	Jan. 15
Midwest Rubber Reclaiming Co.	Com.	$0.25	Feb. 1	Jan. 20
Philadelphia Insulated Wire Co.	Com.	$0.10 s.	Feb. 15	Feb. 1
S.S. White Dental Mfg. Co.	Com.	$0.25 incr.	Feb. 15	Jan. 31

LEGAL

Duty on Elastic Material

The United States Court of Customs and Patent Appeals on January 6 ruled that elastic material, 5/8-, 1/2-, and 3/8-inch wide and 36 to 144 yards long, composed of rayon and rubber, with fast edges, made on a braiding machine,

Tire Production Statistics

	Pneumatic Casings		
	Inventory	Production	Shipments
1938	8,451,390	40,906,735	43,132,302
1939	8,664,505	57,612,731	57,508,775
1940	9,178,537	59,352,643	59,155,326
1940			
Jan.	9,347,953	4,953,585	4,270,137
Feb.	10,123,824	4,888,250	4,112,379
Mar.	10,747,370	5,007,042	4,345,674
Apr.	10,881,029	5,105,953	5,009,762
May	10,576,217	5,415,314	5,720,249
June	8,881,101	5,147,871	6,926,553
July	9,299,014	4,675,773	4,284,086
Aug.	9,732,108	4,703,522	4,244,782
Sept.	9,809,196	4,495,402	4,572,311
Oct.	9,447,962	5,081,939	5,560,709
Nov.	9,118,243	4,837,501	5,136,744
Dec.	9,178,537	4,998,520	4,971,504

	Pneumatic Casings		
	Original Equipment	Replacement Sales	Export Sales
1938	10,716,130	30,565,008	1,048,934
1939	18,207,556	38,022,034	1,279,185
1940	22,261,723	35,724,034	1,169,569
1940			
Jan.	1,804,826	2,376,455	88,856
Feb.	1,974,466	2,051,487	86,426
Mar.	2,050,250	2,217,627	77,797
Apr.	2,095,220	2,823,293	91,249
May	1,998,735	3,635,652	85,862
June	1,925,420	4,918,341	82,792
July	857,684	3,377,166	79,949
Aug.	704,565	3,386,629	82,314
Sept.	1,464,925	2,948,797	97,942
Oct.	2,322,313	3,098,371	140,025
Nov.	2,437,692	2,576,816	122,236
Dec.	2,626,190	2,216,567	128,747

	Inner Tubes		
	Inventory	Production	Shipments
1938	8,165,696	37,847,656	40,292,614
1939	7,035,671	50,648,556	51,190,314
1940	7,014,154	52,360,867	52,306,767
1940			
Jan.	7,633,798	4,286,924	3,826,667
Feb.	7,896,960	4,210,904	3,809,733
Mar.	8,182,655	4,399,550	4,113,735
Apr.	8,258,331	4,618,361	4,542,735
May	8,243,050	4,739,072	4,738,668
June	6,841,281	4,359,486	5,721,096
July	7,093,996	4,027,565	3,797,325
Aug.	7,802,303	4,326,827	3,614,871
Sept.	7,950,104	4,114,850	3,991,182
Oct.	7,647,462	4,556,593	4,877,770
Nov.	7,055,352	4,111,392	4,691,763
Dec.	7,014,154	4,664,984	4,646,385

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

is dutiable at 90% ad valorem. A. Stein & Co., Chicago, Ill., had contended that the rate should be 60% for an elastic material and not braid, as it is used as supporters on girdles, a sew-on, and as elastic put upon reels to be sold to the trade among which it is known as "elastic," "braided elastic," or "hickory elastic."

In another ruling the high customs court had previously declared that strips of plain elastic material, about ¼-inch wide and five inches long, sewed by the ends to each corner of silk covers for card tables were braids and the covers were subject to duty as articles composed in part of braid.

Carbon Black Eliminates Photograph "Clicks" [1]

As conventional wax is a non-conductor, electricity generated by the stylus in phonograph recording builds up until it discharges across the grooves or causes the stylus to jump, thus creating ticking sounds in the master record. Since, however, carbon black is an electrical conductor, when it is well distributed throughout the wax, according to a recent patent, static is drawn off before large charges can develop. The carbon black is also said to improve the cutting of the stylus into the wax, thus further reducing noises and also yielding high fidelity recording.

[1] *Witcombings,* Dec., 1940, p. 8.

FROM OUR COLUMNS

50 Years Ago—February, 1891

In 1848 the Hayward Rubber Co., the L. Candee Co., Ford & Co., of New Brunswick, N. J., and the Newark Mfg. Co., purchased the exclusive right to manufacture rubber boots and shoes under the Goodyear patent. Two other concerns, the Goodyear Metallic Rubber Shoe Co., and Onderdonk & Letson of New Brunswick, paid royalties. (p. 125)

Experiments have shown that pure metallic copper has the greatest influence in destroying the elasticity of India rubber; and, in the order named, platinum, aluminum, palladium, and lead have a similar influence. (p. 127)

The moment the "instantaneous self-expanding life-saving belt" touches the water two chemical substances contained in it are united and it begins to inflate with gas. (p. 129)

Don Juan del Castillo, who was sent out by the Spanish government toward the close of the last century to examine the vegetable productions of Mexico, died in that country in 1793, but the rubber tree that he discovered was named after him, *Castilla elasticao,* by the author Cervantes. (p. 131)

There were in 1886 seven rubber manufacturers in Trenton: the James F. Brooke, the Home Rubber, the Hamilton Rubber, the Trenton Rubber, Whitehead Bros., Mercer, and Star. (p. 134)

25 Years Ago—February, 1916

In a recent issue of the Petrograd "Nowje Wremja," a chemist named Ostromyslensky is credited with having discovered a process for making artificial rubber from vodka. (p. 224)

The Fisk Rubber Co. announces that, under a new schedule, working hours have been decreased from 55 to 50 hours a week. (p. 244)

The General Rubber Manufacturing Co. has changed its name to the General Tire & Rubber Co. (p. 251)

The Bayer company in Germany is reported to be spending £100,000 on a plant for the manufacture of synthetic rubber. (p. 253)

Out of 300 bags of parcels post mail seized on the steamship "Hellig Olav," 109 bags contained nothing but crude rubber. The estimated weight of the rubber was 8,000 pounds. (p. 254)

The cultivation of rubber in German West Africa began about 15 years ago with planting of *Funtumia Elastica. Hevea* was not introduced until 1907. (p. 256)

Gutta percha is only to be found in East Asia. In Netherlands East India it grows in the Rhio Archipelago, in Banka, Borneo, Sumatra, and in New Guinea, besides a few other islands. (p. 257)

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of World	Total
1938...	406,300	168,172	7,700	12,300	11,300	25,700	58,100	107,900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939...	486,348	70,800¶	9,552	15,426	9,593	32,508	33,751§	62,344§	12,582§	42,351	5,415§	7,965a	14,000*	61,866	603,842¶
1940															
Jan. ..	71,541	....	1,049	921	891	5,047	....	....	....	4,547	....	....	....	....	....
Feb. ..	41,797	....	565	1,846	694	3,508	....	....	....	5,243	....	....	....	....	....
Mar. ..	58,283	....	756	1,784	....	3,062	....	....	....	6,057	....	....	....	....	....
Apr. ..	70,135	....	606	1,612	....	3,096	....	....	....	2,000*	....	....	....	....	....
May ..	50,621	....	589	2,128	....	3,108	....	....	....	2,500*	....	....	....	....	....
June ..	53,266	....	543	1,181	....	1,062	....	....	....	3,000*	....	....	....	....	....
July ..	69,374	....	783	1,902	....	5,112	....	....	....	3,000*	....	....	....	....	....
Aug. ..	72,612	....	767	2,508	....	4,605	....	....	....	4,500*	....	....	....	....	....
Sept. ..	78,126	....	....	2,485	....	2,743	....	....	....	....	....	....	....	....	....
Oct. ..	74,400	....	....	590	....	8,336	....	....	....	....	....	....	....	....	....

*Estimated, and to Aug. 31, 1939, only. †U. K. figures show gross imports, not net imports. ‡Including imports of Austria and Czechoslovakia. ¶Up to Aug. 31, 1939, only §Up to July 31, 1939, only. *a*Up to Sept. 30, 1939. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia†	Nigeria (incl. Brit. Cameroons)	Other Africa	South America	Mexican Guayule	Grand Total
1938 ..	372,000	298,100	49,500	8,500	6,700	9,500	17,800	41,600	59,200	862,900	2,000*	2,900	3,100	5,900*	15,300	2,800	894,900
1939 ..	376,755	372,046	61,028	9,241	6,616	11,864	24,014	41,753	65,219	968,536	2,079*	5,435	2,824	6,600*	16,094	2,861	1,004,429
1940																	
Jan. ..	26,229	54,148	7,698	839	833	1,858	2,256	5,722	5,238	104,821	185	1,191	147	600	1,550	389	108,883
Feb. ..	45,651	37,958	8,946	2,030	892	1,164	2,678	4,307	6,931	110,557	94	477	234	600	1,662	239	113,863
Mar. ..	47,885	42,355	5,305	1,070	871	1,050	3,526	3,111	3,551	108,724	178	548	343	600	1,482	346	112,221
Apr. ..	25,454	44,416	4,144	817	990	1,799	2,951	1,834	2,927	85,332	203	598	120	600	1,159	317	88,329
May ..	57,874	40,436	7,337	972	1,046	1,370	2,696	2,582	4,578	118,891	195	364	361	600	2,305	331	123,047
June ..	45,471	44,834	5,603	841	712	1,421	4,077	2,178	2,730	107,867	168	405	127	600	1,080	101	110,348
July ..	42,861	60,482	7,330	884	310	1,767	2,494	4,253	4,045	124,426	169	342	200*	600	1,035	443	127,215
Aug. ..	45,872	46,631	8,139	994	75	1,593	2,640	4,545	7,337	117,776	285	308	200*	600	1,233	327†	120,729
Sept. ..	58,892	44,024	9,985	1,258*	61	1,743	2,404	3,247	9,303	130,917	100	323	200*	600	1,295	280†	133,715
Oct. ..	52,767	50,139	8,127	1,332*	509	1,693	2,564	3,355	2,082	122,568	200*	600*	200*	600	1,860	200*	126,228
Nov. ..	36,045	37,387	5,623	1,331*	1,295	1,130	3,360	3,463	6,715	96,349	200*	600*	200*	600	1,500*	200*	99,649

* Estimated. †Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

EUROPE

GREAT BRITAIN

Pneumatic Fabric Guiders

Manufacturers of rubberized fabrics recently had their attention called to the pneumatic fabric guiders made by Daniel Foxwell & Sons, Ltd., Manchester, which eliminate all hand labor for guiding. The guiders, in use in the textile finishing trade for many years, are provided with patent air valves of simple construction and great accuracy. Air at a pressure of 10 to 20 pounds per square inch, according to the weight of the cloth, is used, and specially designed compressors are available that can be driven from any continuously running shaft. The guiders are said to insure accurate guidance and remove all creases from the fabric and all curls from the selvedges. The guiders will work at any speed and can be adapted to any machine to which cloth has to be guided in the open width. Two types of guiders are made: one stands on the floor in front of the unit which it is to serve; while a second kind is built into the machines. Rubber manufacturers have begun to use the guiders with spreaders and slitters, calenders, rolling-up machines and bias cutters.

New Detel Product for Hot-Water Equipment

While the good qualities of chlorinated rubber paints, as their resistance to various corrosive influences, are receiving increasing recognition, their use has hitherto been limited by the fact that chlorinated rubber does not satisfactorily resist temperatures over 115° F. in wet heat and over 175° F. in dry heat. However the manufacturer of Detel, chlorinated rubber paint has developed a modified product especially intended for use on iron and steel, called D.M.U. (Detel Metal Undercoat). This material, which contains 92% of finely divided metallic zinc, is claimed to be able to withstand the action of boiling water and dry heat temperatures higher than that of boiling water. It is therefore recommended for use on all hot water equipment, tanks, etc., to replace galvanizing, which the war is making difficult to obtain.

The Limitations of Supplies Order

The Limitation of Supplies (Miscellaneous) order, in effect about the middle of 1940, required manufacturers and wholesale dealers of controlled goods to register and at the same time restricted their deliveries to retailers to 66⅔% of the value of deliveries made during the last half of 1939. The chief rubber wares affected were rubberized garments, corsets, etc., floor coverings, sporting goods, games, gymnastic and athletic equipment, and toys. The order has recently undergone certain revisions and now also covers surgical goods. The value of goods that may be delivered during the first six months of 1941 has been reduced to 50% (based on the same period of 1940) for corsets and similar goods, surgical goods and floor coverings, and to 25% for the other lines mentioned above.

Notes

The production and consumption of tar products are to be regulated and coordinated, and Major T. Knowles, vice chairman of the board of Monsanto Chemicals, Ltd., has been appointed Controller of Tar Products. Major Knowles, also a director of the Creosote Producers Association and a member of the Council of the Association of British Chemical Manufacturers, has had extensive experience in the chemical industry.

A new device, said to prevent injury to the brain and ears during explosions and air raids, has just been put on the market and consists of a crescent-shaped solid rubber block intended to be clenched between the teeth.

Sponge Rubber as Body Protection against Bomb Blasts

Dr. S. Zuckermann, of Oxford, who has been conducting experiments on the effect of blasts on the human body and in cooperation with the Ministry of Home Security, has proved that injury directly attributable to blast is due usually to impact on the body walls, giving the chest or back or sides of the person too close to the blast a violent punch, and transmission of the severe impact of this blow through the body disrupts the delicate lung tissues. Consequently he recommends a jacket or vest of sponge rubber as equipment for civil defense forces in England.

Following experiments with explosions from charges up to 70 pounds of high explosives, Dr. Zuckermann found that with a sufficient thickness of sponge-rubber clothing little or no injury resulted to the person exposed to the blast. It is considered doubtful that it would be practical to furnish the fighting forces with sponge-rubber "armor," but it is felt that available facilities could readily equip passive defense workers, including air raid wardens, policemen, firemen, and the auxiliary services.

GERMANY

Brake Linings of Metal Wool and Buna

After years of experimentation a satisfactory brake lining made wholly of domestic materials has finally been developed in Germany. Steel and aluminum wool, which is only 0.03-millimeter thick, is treated with buna so that each fiber is completely covered with rubber. It is claimed that when properly prepared, linings of this material not only show adequate mechanical strength, but in several respects are superior to asbestos brake linings. Contact with oil and grease does not reduce their braking efficiency to any greater extent than is the case with asbestos linings. Water has little effect on braking efficiency. Because of the conductivity of the linings, which permits rapid elimination of heat and thus prevents its accumulation, braking efficiency is practically independent of the heat generated.

The linings have been used on rolling stock at speeds of 120 to 150 kilometers per hour, and it is reported that at a speed of 120 kilometers per hour and wheel pressure of 7,000 kilograms, braking efficiency was 390,000 meter-kilograms considerably better than anything attained with the best asbestos linings. Resistance to wear is also said to be superior to that of linings made from imported materials.

Puncture-Proof Tire

The United States Department of Commerce reports that on November 19, 1940, a novel type of automobile tire, claimed to be absolutely puncture-proof, the invention of Alfred Spencker (German patent No. 689,959), was demonstrated to several trade journal editors in Berlin. It is a soft-rubber solid tire with radial cooling channels leading to an air-intake and is said to be lighter than a pneumatic and cheaper to make. Tests made at the testing laboratory of the Stuttgart Polytechnicum are reported to have shown that both the outer and inner temperature of the tire at a speed of 120 kilometers is much lower than that of any pneumatic tire.

Notes

The Helsingborgs Gummifabriks Galoschen A.G., Tretorn, Vienna, has been liquidated.

Dr. Fritz Konecke, works manager of Continental Gummi-Werke, Hannover, has received the military cross for merit, II class, from the Fuehrer, in recognition of his outstanding services in the interests of military economy.

Directors of Deutsche Michelin-Pneumatik A.G., Karlsruhe, include Gontran Bienvenu, Andre Machery, and Leon Klinger, now residing in France. The Supreme Court at Karlsruhe has appointed Dr. W. Eisenlohr administrator in their absence.

New Wire Insulations

Siemens Werke, Berlin, has developed several new types of insulation for electrical cables exposed to corrosion, moisture, solvents, or greases. To make telephone wires in chemical plants moisture-proof and practically non-flammable they are insulated with silk and coated with synthetic resin. Protodur wires, insulated with a polyvinyl chloride plastic, for wiring electrical appliances and for use under plaster, are said to be acid- and oil-proof, non-flammable, highly resistant to aging, smooth, and almost frictionless for no protective plating is put around the molded insulation. Recommended for heating purposes is the ceramic-insulated Protolit cable. Wires, insulated with Parnit, a soft flexible rubber substitute, also are available with an armoring of folded and finely corrugated metal.

SWITZERLAND

Switzerland has a small but active rubber industry which produces a wide variety of goods including tires and tubes, most mechanicals, and household lines. Official reports for 1937 showed 17 rubber factories employing 1,000 persons. Among the chief companies are Huber A.G., Pfaffikon, which produces hose and solid and pneumatic tires for motor vehicles, Fabrik fur Firestone Produkte A.G., Pratteln, tires; Fritz Maurer, Gelterkinden, cycle tires; Palo Sieber, Chiasso, cycle tires; Schweizerische Gummiwarenfabrik Lonstroff A.G., Aarau, hose; Schweizerische Draht-und Gummiwerke Alltdorf, Uri, hose; and Suhner & Co., Herisau, hose.

Several firms are engaged in the manufacture of heels, soles, gloves, rubber rolls for the paper and textile industries, hard rubber goods, thread, elastic fabrics, druggists' sundries, mats, erasers, dress shields, and packing. In addition six companies recently began to make goods from synthetic rubber. In 1939, Switzerland imported rubber goods valued at 19,108,000 francs; while exports amounted to 3,757,000 francs.

RUMANIA

The Rumanian Government has forbidden all manufacture of rubber goods except footwear and articles for defense purposes. Manufacturers who undertake to make any other kinds of goods without special permits will be held guilty of economic sabotage. At the same time a decree was issued commanding dealers and manufacturers to set aside 50% of all stocks of raw, synthetic, and old rubber for 20 days and hold these stocks at the disposal of the government for military purposes. This blocking of the free use of rubber supplies was later prolonged a further 30 days in respect to crude rubber and extended to cover 75% of the available stocks of old tires and tubes. Export of the remaining 25% of old tires and tubes was prohibited.

Rumania's rubber industry is of recent growth and, until 1939 when the important new Banloc concern began to produce automobile and airplane tires at its factory at Fioresti in the Prahova district, was practically confined to rubber footwear and certain lines of mechanical goods. In line with the development of the industry, crude rubber consumption rose from 768 tons in 1935 to 2,066 tons in 1938, but dropped to 1,268 tons in 1939 as a result of the war.

According to last reports Rumania had eight rubber factories. The largest was Banloc, capitalized at 150,000,000 lei, which cooperates technically with the B. F. Goodrich Co., Akron, O., U. S. A., and was producing 250 tires daily. The Caucіucul Quadrat S.A., Bucharest, was formerly connected with the Quadrat Baltic India Rubber Co., Riga, Latvia. It has a capital of 20,000,000 lei and makes footwear and mechanicals. Caurom Fabrica de Articole de Cauciu S.A., Bucharest, was formed in 1938 with a capital of 20,000,000 lei. It spe-

cializes in footwear, and its 1,000 employes produced 500,000 pairs a year at the Cernauti factory. One of the oldest Rumanian rubber companies is Uzinele Chemice Romane S.A., which manufactures rubber shoes, sandals, and tennis shoes. It has a capital of 25,000,000 lei and 1,200 employes.

FAR EAST

MALAYA

Rubber Industry "Dying"?

The danger of the rubber industry becoming a "dying" one and the necessity of replanting were dwelt upon by A. J. Ritchie at the annual meeting of the Cairo (Malay) Rubber Syndicate, Ltd., some months ago. He said:

"When I was in Ceylon last year a very well-known and up-to-date visiting agent informed me that no less than 14% of the trees on the estates he visited—including replanted areas—would never be tapped again owing to *Anno Domini* poor bark renewal, and other causes. . . . I have little doubt that the same percentage applies to Malaya. Naturally, as the years roll on, if, for financial and other reasons, sufficient replanting is not done, that percentage will inevitably increase and the industry can then be said to be a dying one!

"Up to the end of March, 1939, replanting permits in Ceylon had been applied for on only 4½% of the total acreage under rubber. . . . In Malaya only 81,000 acres (or about 2½% of the total acreage under rubber) had been replanted—or permits granted for replanting, not always the same thing—up to the end of 1938. Since those dates I believe a very large amount of replanting has been done in both countries. The Government authorities in Malaya are evidently aware of this 'dying' menace. They have started a 'five-year plan'; that is to say, they are offering growers quotas for five years on areas replanted."

Serum as a Latex Coagulant

Toward the end of 1939, when a serious shortage of coagulant, especially formic acid, threatened, the Rubber Research Institute of Malaya issued a circular describing a method of economizing on formic acid by utilizing the serum which remains after coagulation with the acid and which was formerly thrown away. According to the Institute's standardized procedure, field latex is diluted to a dry rubber content of 2¼ lb./gal. and then run into half its volume of serum in a coagulation tank; next the usual amount of suitably diluted formic acid is stirred in, and the normal process for sheet manufacture is then followed.

Recently V. H. Wentworth[1] reported on the results of his examination of the quality of rubber prepared by the above method. Briefly, he finds that the use of serum to assist coagulation produces a somewhat harder, dark-colored and faster-curing sheet having a slightly reduced nitrogen content and increased water-absorption capacity, but without increased liability to mold growth. The chief drawbacks are increased risk of bubble formation in the sheet—a defect which is penalized on the market by a cut in price—and increased variability of smoked sheet. The disadvantages of the method, while freely admitted, are not held serious, and the final opinion is that in abnormal times its possible value is considerable.

Sir Shenton Thomas Continuing in Office

Sir Shenton Thomas, governor and commander-in-chief of the Straits Settlements and high commissioner for the Malay States, whose period of service should normally have ended in 1940, is to remain in office, the Colonial Office announced.

[1] "The Use of Serum as a Latex Coagulant." *J. Rubber Research Inst. Malaya*, Oct., 1940.

Imports and Exports of Rubber Coagulants

During the first six months last year Malaya imported rubber coagulants valued at 1,210,564 Straits dollars. Acetic acid totaled 2,301 tons, value S$998,190, and formic acid, 403 tons, value S$212,374. During the first half of 1940 acetic acid exports were 170 tons at S$106,108; formic acid, 76 tons at S$54,881; and other rubber coagulants, 234 tons at S$100,048.

NETHERLAND INDIA

Crude Rubber Shipments

The Central Bureau of Statistics reveals that Netherland India rubber exports in 1939 totaled 378,100 metric tons, against 302,882 metric tons in 1938. Latex exports in 1939 were exceptionally high, amounting to almost three times those for 1938, as the following table shows:

	Metric Tons	
	1939	1938
Latex (Estates)	17,927	6,280
Sprayed Rubber (Estates)	102	1,125
Dry Rubber (Estates)	175,493	148,881
Total Estate Rubber	193,522	156,286
Native Rubber	184,578	146,596
Total Netherland India	378,100	302,882

Preliminary figures show that exports for October, 1940, totaled 50,838 metric tons, a record. Of this amount, estate rubber accounted for 23,678 tons, and native rubber, 27,160 tons.

Difficulties in Packing Rubber

At the West Java Experiment Station various methods of packing rubber other than in the usual plywood cases were tested in 1938. The materials tried were Plykraft latex paper, Bates paper bags made at a factory at Padang from Swedish Kraft paper, ordinary gunny and prepared gunny, and rubber sheet. It was found that: the Plykraft paper stuck to the rubber; the Bates bags were not strong enough and tore; in both types of gunny packing, fibers stuck to the rubber. As to packing in rubber sheet, the method followed differs somewhat from that used at the Far Eastern estates of the United States Rubber Co.[1]; the most important deviation is that whereas in the latter process the wrappings are sealed by means of a cement, in the Java experiment the laps were held together by pricking with an awl. That this process has its drawbacks seems to be indicated by the fact that five bales, sheet-wrapped and sent to Amsterdam, Holland, arrived with the outer covers more or less opened up.

Brokers and dealers who examined the packages found many objections[2] to the new method of wrapping in so far as it applied to rubber that is to be warehoused and delivered on the usual contracts, but admitted that these objections would probably fall away where a producer made a special agreement on packing with a consumer. Among the objections were: difficulty in removing wrappings for sampling and later replacing them; difficulty of handling and stacking bales in the warehouse due to deformation of the bales in transit; difficulty of removing wrappers and separating individual sheets in factories where this practice is followed; where bales are cut up by machine, the deformation of the bales necessitates removal of a larger quantity of rubber that must be classified as inferior. European factories also object to the use of talc on wrapping. It was generally agreed that while the inside rubber retained its normal value, part of the sheets used for wrapping was rendered worthless because of embedded dirt. This latter circumstance was a factor in the final

[1] "The Packaging of Smoked Sheets for Plantations Shipment." Don E. Andrews, INDIA RUBBER WORLD, Mar. 1, 1940, pp. 33-37.

[2] EDITOR'S NOTE. It must be remembered that according to the reports above, none of the other methods were found to be perfect, and some of the objections to rubber sheet packages would be common to other types of bales.

opinion given by the Netherlands Rubber Trade Association which stated that while there would no doubt eventually be considerable improvement in the method of packing in sheets, nevertheless it was preferable to seek some other means of packing to offset the shortage of plywood cases. Despite the findings at the West Java Experiment Station, the Association also recommends that further tests be conducted to see whether it would not be possible to develop a cheap and suitable wrapping from some specially reenforced and impregnated paper, which suggestion is now receiving the serious attention of the Experiment Station.

JAPAN

Rubber-soled socks and rubber shoes are among the daily necessities which have for some time only been obtainable with ration cards.

The Ministry of Commerce has published regulations, effective January 20, 1941, intended, among other matters, to combine existing export-control companies into a single agency in each industry, and further to put under the control of the Japan Foreign Trade Promotion Co., organized December 24, 1940, the distribution of raw materials essential in the manufacture of export articles. The items affected are: sundry goods, textiles, celluloid articles, glassware, rubber goods, bicycles, slide fasteners, wooden boxes, chemical products, and machinery.

For some years Yokohama Rubber Co. has conducted tests in growing Para and Manihot rubbers in Japan. Japan-grown Manihot appears of poor quality, but Para rubber from the Akadi plantations in Formosa seem promising. *The Journal of the Japanese Society of Chemical Industry* reported[1] that Formosa Para rubber was used in making tire treads; the compound consisted of rubber, 100 parts, carbon black 45, zinc oxide 5, softener 5, accelerator 1, antioxidant 1, sulphur 3. Such treads, run side by side with treads of standard smoked sheet, under exceptionally severe road conditions proved slightly inferior to the latter. It is expected that under normal road conditions there would be no appreciable difference in the performance of Formosan rubbers as compared with standard rubber.

[1] July, 1940, p. 198B.

SOUTH AFRICA

The development of the local rubber goods industry has led to a marked reduction in imports of tires and tubes into South Africa in recent years. Whereas the country bought passenger and truck tires to a value of £392,985 in 1936, the value of imports of these goods in 1939 was £296,303. The United Kingdom, the chief source of supply, sent £127,285, the United States, £78,827, and Canada, £78,015. Imports of inner tubes for automobiles in 1939 were valued at £28,616, of which Canada shipped £11,950, the United States, £8,127, and the United Kingdom, £7,509.

NEW ZEALAND

New Zealand imported 79,060 pneumatic tires in the first half of 1940, of which 56,402 came from the United Kingdom and 21,436 from Canada. Imports of inner tubes in the same period came to 40,375 units, of which the United Kingdom supplied 35,072 and Canada 4,868.

Editor's Book Table

BOOK REVIEWS

"1938-39 Bibliography of Rubber Literature (Excluding Patents)." Compiled by Donald E. Cable. Published by *The Rubber Age*, 250 W. 57th St., New York, N. Y. 1940. Cloth, 6 by 9 inches, 228 pages. Author and subject indices. Price $2.

This volume, covering the years 1938 and 1939, is the fourth in this series of bibliographies of rubber literature, excluding patents. The preceding volumes were published for separate years: 1935, 1936, and 1937. The current work continues the letter-number combination method of identifying references which expedites the use of the cross-references and indexes. For the first time editorial annotations have been added parenthetically to some of the titles to point out certain phases of subject matter not clearly indicated in the title. In cases where an article has been reprinted, abstracted, or translated, the aim has been to indicate all locations in one place after the author's name and the title of the article. The classification is by subject matter with the references broken down into 75 separate groups. Ready means for cross-reference are available through a comprehensive subject index.

With the current voluminous and diversified character of published work in this field, the importance of a cumulative bibliography, such as the present one, cannot be overemphasized as an aid in directing the research worker's literature searches.

"Catalysis—Inorganic and Organic." Sophia Berkman, Jacque C. Morrell, and Gustav Egloff. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1940. Cloth, 6 by 9 inches, 1130 pages. Author and subject indices. Price $18.

Perhaps no other phenomenon has contributed so much to the rapid growth of the American chemical industry as has catalysis. In the production of such essentials to our national defense program as aviation fuel, high explosives, and synthetic rubber, the application of catalysis is of special significance. The book has been divided into eleven chapters: The Phenomenon of Catalysis; Adsorption and Catalysis; Heterogeneous and Homogeneous Catalysis; The Activity of the Catalyst; Inhibitors in Catalysis; Promoters and Poisons in Catalysis; Carriers in Heterogeneous Catalysis; Catalytic Reactions in Inorganic and Organic Chemistry; Physical Conditions in Catalytic Reactions; Classification of Catalysts with Respect to Type of Reaction; and Catalysis in the Petroleum Industry.

The chapter on classification is of special note, comprising 346 pages and recording in tabular form the results of nearly 3,000 separate investigations. This chapter includes data on the catalytic polymerization of the diolefins (including butadiene and isoprene) and the vinyl compounds, as well as references to the cyclization of rubber. The theoretical aspects of polymerization are discussed in one chapter; while the more practical aspects of this subject are treated in some detail in the chapter on the petroleum industry. In the latter chapter the subject of synthetic rubber is reviewed with particular emphasis placed on the catalytic dehydrogenation of monoölefins to diolefins. In the discussion of negative catalysis in the chapter on inhibitors, antioxygenic activity as it relates to the function of antioxidants in rubber is dealt with, and in this connection the theory of Moureu and Dufraisse is outlined. This volume, which correlates a tremendous amount of data on the subject, should aid investigators interested in catalytic methods in directing their research endeavors along systematic lines.

"Money in Exports." Walter Buchler. Published by Useful Publications, 523-4 Mansion House Chambers, London, E.C.4, England. 1940. Cloth, 4¾ by 7¼ inches, 221 pages. Price $3 net.

The author of this book points out that, if one wishes to

trade with a nation, merely having the goods available is not enough. The tastes and peculiarities of that nation must be studied. This book, which purports to show how trade with a particular country can be developed, deals with 41 markets throughout the world, with a separate brief chapter for each market. The local methods and business practices of each market are discussed, and the dangers and pitfalls to be avoided are pointed out.

"Sabotage—How to Guard against It." Harry D. Farren. Published by National Foremen's Institute, Deep River, Conn. 1940. Cloth, 5⅜ by 8 inches, 56 pages. Price $1.

With American industry rapidly being geared up for "all possible aid to Britain," the danger of sabotage increases markedly. The purpose of this book is to warn American workers of the constant infiltration of saboteurs into the vital industries of this nation and to inform these workers how they can combat the forces of sabotage. The book highlights the sabotage cases during the World War and cites the operations of saboteurs in this country last fall.

NEW PUBLICATIONS

"The Vanderbilt News." Vol. II, No. 1. January-February, 1941. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 24 pages. With the current issue, John M. Ball, 20 years with Vanderbilt, takes over the active responsibility for editing the *News*. He succeeds Dr. William F. Russel, who was in charge of the *News* since January, 1931, and now remains in an advisory capacity. This issue is divided into two parts: an article on "X-Ray Studies of Rubber. Part I. Fundamentals", by George L. Clark, University of Illinois, and a presentation of formulas and test data on compression and extension set.

The article on X-rays, which presents in simple language the rudiments of X-ray technology, particularly as it applies to the study of rubber, should afford those unfamiliar with the subject an opportunity to become acquainted with the basic concepts involved. The section on compression and extension set presents test data on a wide range of compounds, with variations in acceleration and loading. Data for normal sulphur and sulphurless Tuads vulcanization are also presented, as are results of the effect of heating before test. The issue also contains a list of libraries receiving the *News*.

"Goetze Gaskets." Catalog 53. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J. 60 pages. This catalog, the forward of which states that the firm was founded in 1887, presents the company's complete line of gaskets, packings, and related items. The bulk of the gaskets shown are of the all-metal and metal-asbestos types; while a number of packings described contain rubber. An interesting introduction outlines the principles of gasket engineering.

"Index to A.S.T.M. Standards Including Tentative Standards." American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Distribution free. 172 pages. The latest edition of this index gives information on all of the 952 standards of the A.S.T.M. as of December 1, 1940, and is of value to anyone wishing to ascertain whether the Society has issued standard specifications, test methods, or definitions covering a particular engineering material or subject. All items are listed under appropriate keywords according to the particular subjects they cover. There is also a list of the specifications and tests in numerical sequence of their serial designations.

"Bakelite Molding Plastics." Bakelite Corp., 30 E. 42nd St., New York, N. Y. 32 pages. This booklet is designed to provide condensed information about "Bakelite" moldable plastics —their characteristics, properties, uses, and methods of fabrication. The materials covered consist of two broad classes— thermosetting phenolics and ureas and thermoplastic acetates and polystyrenes. A "plastic comparator" chart which is included indicates the order of suitability of a number of plastics for obtaining various physical characteristics.

"Cabot Carbon Black—Measuring Blackness." Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. 12 pages. This booklet pictorially describes the operation and application of the Cabot nigrometer, an instrument used by the firm in evaluating quantitatively the blackness of carbon blacks used in the rubber and ink industries. Graphs presented demonstrate the close relations between color value as measured by the nigrometer and particle size, and between particle size and the physical properties imparted to rubber.

"1941 *Modern Plastics* Catalog." Breskin Publishing Corp., 122 E. 42nd St., New York, N. Y. 476 pages. Price $3.50. Formerly published annually as an augmented issue of *Modern Plastics,* the monthly trade publication for the industry, this catalog is now published in separate form. It has nine main divisions: Plastics Engineering (photos and flow sheets of production of raw materials); Materials (a series of articles on the different types of plastics); Molding and Fabricating; Machinery and Equipment; Laminates; Plastic Coatings; Synthetic Fibers; Bibliography and Nomenclature; and Directory. The "plastics properties chart" appears again, completely revised, and there are two new charts this year: one on "solvents" and the other on "plasticizers." This book should be a valuable aid to the rubber manufacturer using plastics or contemplating their use.

"ResiNews." Vol. V. October, 1940. Stroock & Wittenberg Corp., 60 E. 42nd St., New York, N. Y. 44 pages. In this booklet will be found concise tabulations on the more important characteristics and uses of the numerous "S & W" synthetic and natural resins. The synthetics are classified as: ester gums, pure and modified phenolics; and pure and modified alkyds; while the natural resins include: Damar, East India, Macassar, Pontianak, Philippine, Congo, Kauri, Accroides, Sandarac, and Mastic. A refinement of the "mercury" method for resin melting point determinations is presented.

"Crude Rubber," United States Tariff Commission, Washington, D. C. This report on crude rubber brings up to date an earlier report by the commission which was prepared in November, 1939. The current report gives special reference to the effect of war conditions on United States imports of crude rubber. The subjects covered, as they appear in the text, are: importance of rubber; world production; international rubber regulation agreement; world imports; United States imports; American-controlled plantations abroad; transportation and marketing; United States reexports; consumption, stocks, and prices; government reserve stocks (cotton-rubber exchange agreement and Rubber Reserve Co.); reclaimed rubber; synthetic rubber; and conservation of rubber. Statistical data covering pertinent information are presented in tabular form, and a map showing the location of rubber producing areas is included.

Tax Booklets. "Your Income Tax." 128 pages. "Your Corporation Tax." 128 pages. J. K. Lasser. Published by Simon & Schuster, 1230 Sixth Ave., New York, N. Y. Price $1 each. The 1941 editions of these two booklets explain the many important changes in the tax laws which were effected last year. "Your Income Tax," written for the average man and woman, shows how to prepare your income tax return quickly and correctly and points out each and every deduction to which you are entitled. "Your Corporation Tax" is a guide for executives, attorneys, and tax advisors in computing normal and excess profits taxes.

"The Plastics Industry." Institute of Plastics Research, Sponsored by *Modern Plastics Magazine,* 122 E. 42nd St., New York, N. Y. 54 pages. This analysis of the plastics industry, which relates to molding only, covers both the productive and consumptive phases of this industry, thus evaluating the potentialities of this market for suppliers of materials and equipment, as well as indicating the size and rate of growth of the industry. The data are presented graphically, and in the case of equipment the figures are broken down into separate groups and items. The booklet is concluded with a comprehensive article on "History of Plastics and Their Uses," by Gordon M. Kline, technical editor of *Modern Plastics.*

"Simplex-Latox Insulation." Data Sheet 101. Simplex Wire & Cable Co., 79 Sidney St., Cambridge, Mass. 4 pages. This data sheet presents applications, properties, and specifications of Latox-insulated wire, described as the first "small diameter" rubber insulated wire to be placed on the market and as the only wire to use prevulcanized latex as an insulation. The applications cited for this type of insulation include conductors for light-weight small-diameter cables for control, signal, telephone, telegraph, and radio systems and insulation for small-diameter building wire.

"Cotton Production and Distribution—Season of 1939-40." United States Department of Commerce, Washington, D. C. For sale by the Superintendent of Documents, Washington, 10¢. 52 pages. Bulletin 177 presents statistics for the twelve months ending July 31, 1940, on: supply and distribution of cotton and linters in the U. S.; cotton production, consumption, and stocks in the U. S.; imports and exports of cotton; world's production and consumption of cotton; and cottonseed and cottonseed products.

"Directory of Association Members." January 1, 1941. Sixth Edition. Association of Consulting Chemists & Chemical Engineers, Inc., 50 E. 41st St., New York, N. Y. 62 pages. This directory is designed to aid those who need chemical advice or service and includes alphabetical and geographical listings of members of the Association. Scope sheets for each firm describe the services available.

"List of Inspected Gas, Oil and Miscellaneous Appliances." December, 1940. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 157 pages. This list, revised semi-annually, includes: gasoline hose of the rubber-metal and synthetic rubber types, sheet packing for use with hazardous liquids, millinery cement made from rubber dissolved in carbon tetrachloride and benzene; carbon black; and electrically conducting rubber tires for use on airplanes, trucks, buses, and passenger cars.

RUBBER BIBLIOGRAPHY

Rubber in White Manufacture. *Rubber Age (London)*, Dec., 1940, p. 284.

Wartime Manuring Problems. Shortages in Malaya. *Rubber Age (London)*, Dec., 1940, p. 283.

Rubber in Power Transmission. III. P. Grodzinski, *Rubber Age (London)*, Dec., 1940, pp. 281-82.

Roll Mixers and Calenders. H. C. Young, *Rubber Age (London)*, Dec., 1940, pp. 277-79, 282. (To be continued.)

Mattresses. *House Beautiful*, Feb., 1941, pp. 50-52, 78-81.

Rubber for Vibration Damping. Abstract of paper by E. F. Reising, *Canadian Chem. Proc. Industries*, Dec., 1940.

Protection of Glass in Factories. *India-Rubber J.*, Nov. 30, 1940, pp. 1-2.

A Proposed New Method of Retarding the Aging of Vulcanized Rubber by Means of Peroxides and Nitro-Compounds. S. Minatoya and T. Ando, *India-Rubber J.*, Dec. 14, 1940, pp. 3-5, 8-9.

Heat Conductivity of Zinc Oxide. H. F. Johnstone, H. G. Jacobson, and G. W. Preckshot, *Ind. Eng. Chem.*, Jan., 1941, pp. 106-107.

Creaming of Rubber Latex. E. A. Hauser and B. Dewey, Jr., *Ind. Eng. Chem.*, Jan., 1941, pp. 127-30.

Latex Technology. XII. Development in the Ten Years on the Basis of German Patent Literature. C. Philipp, *Gummi-Ztg.*, Nov. 1, 1940, pp. 793-94. (To be continued.)

Determination of Surface Areas. P. H. Emmett and T. De Witt, *Ind. Eng. Chem.*, Jan. 15, 1941, pp. 28-33.

Modern Armies Are Dependent on Rubber. A. N. Wecksler, *Rubber Age (N. Y.)*, Jan., 1941, pp. 237-39.

Effect of Various Sulphur-Accelerator Ratios in Vulcanized Rubber. F. S. Conover, *Rubber Age (N. Y.)*, Jan., 1941, pp. 243-52.

Mechanical Developments in the Field of Rubber during 1940. *Rubber Age (N. Y.)*, Jan., 1941, pp. 253-54.

Patents and Trade Marks

APPLICATION

United States

21,689. (Reissue.) **Torque-Brake Shock Absorbing Wheel.** W. A. Brown, Philadelphia, Pa.

2,225,728. **Separable Electrical Connector.** W. T. Weidenman, Sr., Spring Valley, assignor to Telephonics Corp., New York, both in N. Y.

2,225,758. **Oil Seal.** L. H. Stein, assignor to Aetna Ball Bearing Mfg. Co., both of Chicago, Ill.

2,225,764. **Throat Bag.** C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.

2,225,772. **Moving Stairway Handrail.** J. Dunlop, Ridgewood, assignor to Westinghouse Electric Elevator Co., Jersey City, both in N. J.

2,225,858. **Mattress Supporting Structure** Comprising Parallel Slats Embedded in Sponge Rubber Blocks. F. O. Church, assignor to Dunlop Tire & Rubber Corp., both of Buffalo, N. Y.

2,225,864. **Fountain Pen.** B. W. Hanle, Elizabeth, N. J., assignor to Eagle Pencil Co., a corporation of Del.

2,225,980. **Head Lamp Assembly** with Flexible Seal. W. C. Casson, assignor to Briggs Mfg. Co., both of Detroit, Mich.

2,225,981. **Head Lamp Assembly** with Resilient Casing. W. C. Casson, assignor to Briggs Mfg. Co., both of Detroit, Mich.

2,226,001. **Packing Gland.** H. E. La Bour, Elkhart, Ind.

2,226,039. **Fluid Line Connection** (Rubber Covered). S. Wiltse, assignor to A. S. Allen, both of Detroit, Mich.

2,226,067. **Annular Flexible Gasket** for Pipe Joint (Bell and Spigot). W. J. Morgan, assignor to American Cast Iron Pipe Co., both of Birmingham, Ala.

2,226,133. **Hat** with Elastic Hat Band. F. H. Lee, Jr., Ridgefield, assignor to Frank H. Lee Co., Danbury, both in Conn.

2,226,146. **Elastic Rim for Infants' Cups.** M. B. Smith, New York, N. Y.

2,226,157. **Printing Platen** with Rubber Pad. J. Christie and D. A. Young, Jr., assignors to Eastman Kodak Co., all of Rochester, N. Y.

2,226,163. **Multicolor Plate Printing Tissues or Other Matters.** J. B. Dufour, Villeurbanne, France.

2,226,196. **Trawl Net Trailing or Drag Device** Using Pneumatic Tire Shoes. J. Chant, Plymstock, England.

2,226,225. **Insulated Trolley Wire Guard.** A. Hall and R. E. Jones, both of New Kensington, Pa.

2,226,246. **Molded Strap Ball.** R. Kloepping, Oakland, Calif.

2,226,304. **Rubber-Sleeved Pipe Coupling and Sealing Means.** S. V. Dillon, Tulsa, Okla.

2,226,312. **Bell and Spigot Joint and Seal.** H. R. Kuhns, Killbuck, O.

2,226,344. **Welt Press** with Elastic Pad Box. O. Jacobus, Olean, N. Y.

2,226,382. **Matrix** for Electroforming Foraminous Sheets. E. O. Norris, Westport, assignor to Edward O. Norris, Inc., New York, N. Y.

2,226,388. **Rubber Fold Collar** for Motor Vehicles. Swing Axles. C. F. Richter, assignor to Continental Gummi-Werke A.G., both of Hannover, Germany.

2,226,392. **Shoe and Insole** with Sponge Rubber along and between Margins of Insole and Outsole. F. Sbicca, Philadelphia, Pa.

2,226,406. **Vehicle Wheel Mounting** including a Rubber Cushioning Structure. A. S. Krotz, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,226,409. **Display Device** with Rubber Band Gripper. H. W. and A. C. Patterson, both of Cleveland Heights, O. assignors to S. Wokersien, Omaha, Nebr.

2,226,433. **Multiple Connector** Encased in Soft Rubber Body. W. P. Herman, Providence, R. I.

2,226,453. **Double Cavity Puncture-Proof Tube** for Tires. C. G. Vretman, Atlanta, Ga.

2,226,462. **Trolley Guard Support.** D. A. Ensign, assignor to Ensign Electric & Mfg. Co., both of Huntington, W. Va.

2,226,505. **Cylindrical Rubber Vibration Insulator.** C. Saurer, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,226,516. **Roll-Preventing Rubber Hockey Puck.** A. H. Ross, Marshfield, assignor to Tyer Rubber Co., Andover, both in Mass.

2,226,544. **Engine Starter Gearing** with Yielding Driving Connection. E. E. Baldwin, Elmira, N. Y., assignor to Bendix Aviation Corp., South Bend., Ind.

2,226,546. **Transparent, Elastic Surgical Bandage** Including a Strip of Rubber Hydrohalide. H. W. Bower, assignor to Golden State Supply Co., both of Los Angeles, Calif.

2,226,564. **Life Preserver** with Two Closed-Cell Sponge Rubber Elements. S. Kienitz, Shelton, Conn., assignor to Rubatex Products, Inc., New York, N. Y.

2,226,589. **Laminated Metal Foil and Paper Product,** Utilizing Polymerized Isobutylene as an Adhesive. W. H. Smyers, Westfield, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,226,605. **Pneumatic Spring** for Wheel Suspensions. H. D. Geyer and W. S. Wolfram both of Dayton, O., assignors to General Motors Corp., Detroit, Mich.

2,226,615. **Automobile Door Bumper, Silencer, and Dust Seal.** D. P. Killen, Glendale, Calif.

2,226,646. **Safety Inner Tube** for Pneumatic Tires. L. E. Walk, Drumright, Okla.

2,226,647. **Water and Gas-Tight Flashlight** with Rubber Washers. G. D. Watkins, Ogden, Utah.

2,226,690. **Plug and Socket** for Coazial Lines. F. Bertold, Berlin-Niederschoreweide, assignor to Allgemeine Elektricitats Gesellschaft, Berlin, both in Germany.

2,226,724. **Mine Car Bumper** with Rubber in Shear. R. C. Kepner, Bloomsburg, Pa., assignor to American Car & Foundry Co., New York, N. Y.

2,226,866. **Steering Wheel Cover** with Inner Coating of Rubber. L. E. Lipschultz, St. Paul, Minn.

2,226,876. **Anti-Skid Storm Rim** for Railway Motor Car Wheels. G. S. Schmidt, Elizabeth, Ill.

2,226,892. **Turbine Pump.** Utilizing an Impeller with a Tired Rim. J. R. Betts, Kearney, Nebr.

2,226,950 and 2,226,951. **Molded Rubber Flower Holder.** R. W. Simpson, New York, N. Y.

2,226,956. **Shield** for Hair Drying Purposes. A. Womack, Fort Worth, Tex.

2,226,959. **Hand Telephone** with Rubber Body and Sponge Rubber Ear Pad. A. G. Zimmerman, Indianapolis, Ind., assignor to Radio Corp. of America, a corporation of Del.

2,227,102. **Paints, Printing Inks, Etc.,** Containing a Minor Quantity of Chlorinated Rubber. A. R. Olsen, assignor to Hercules Powder Co. both of Wilmington, Del.

2,227,119. **Wringer.** T. W. Behan, assignor to Nineteen Hundred Corp., both of Binghamton, N. Y.

2,227,130. **Wringer Mechanism.** N. L. Etten, Waterloo, Iowa.

2,227,139. **Printing Plates.** J. W. and D. J. Kelly, assignors to Activated Process Corp., all of Leominster, Mass.

2,227,208. **Elastic Bit Breaker.** J. A. Zublin, Los Angeles, Calif.

2,227,236. **Package for Frozen Confections,** Etc., of Chlorinated Rubber. C. W. Vogt, Norwalk, Conn., assignor, by mesne assignments, to Owens-Illinois Glass Co., Toledo, O.

2,227,250. **Device to Operate Auto Horns.** E. Dirrig, East Akron, O., assignor to American Hard Rubber Co., New York, N. Y.

2,227,276. **Gum Massager.** J. Salit, Brooklyn, N. Y.

2,227,300. **Vehicle Leaf Spring.** H. T. Dow, Elma, N. Y., assignor to Spring Perch Co., Inc., a corporation of N. Y.

2,227,304. **Fluid Seal Assembly.** H. D. Geyer, Dayton, O., assignor to General Motors Corp., Detroit, Mich.

2,227,389. **Nipple** for Nursing Bottles. C. O. Edwards, Oakland, Calif.

2,227,424. **Friction Element** Comprising a Mixture of Asbestos Fibers and a Friction Composition Including a Matrix of a Rubber Friction Compound and Granules of Rubber and Polymerized Cashew-Nut Husk Oil. D. S. Bruce and R. T. Halstead, both of Somerville, N. J., assignors to Johns-Manville Corp., New York, N. Y.

2,227,426. **Arch Brace.** R. A. Davis, Jr., Nampa, Idaho.

2,227,502. **Electric Cable** with Three Elliptical Insulated Multiple-Strand Conductors. L. I. Lomives, Detroit, Mich., assignor to Detroit Edison Co., a corporation of N. Y.

2,227,516. **Paper Sheet** Coated with a Moisture-Resistant Heat Sealable Composition of Paraffin Wax, Rubber, and Titanium Dioxide. R. S. Soanes, Toronto, assignor to Appleford Paper Products, Ltd., Hamilton, both in Ont., Canada.

2,227,521. **Vehicle Steering Apparatus** Utilizing a Body of Vibration Dampening Material. C. C. Utz, Detroit, assignor to Chrysler Corp., Highland Park, both in Mich.

2,227,528. **Cushioned Conduit Support.** P. W. Adler, West Hollywood, assignor to Adel Precision Products Corp., Burbank, both in Calif.

2,227,579. **Steering Wheel Cover** of Rubber and Fabric. E. P. Harley, Oklahoma City, Okla.

2,227,707. **Rubber Dish-Washing Glove** with Textile Yarn Mat Structure on Palm Side of Fingers. A. D. Cooper, Brooklyn, N. Y.

2,227,754. **Rubber-Cushioned Door Handle.** G. V. Jakeway, assignor to Keeler Brass Co., both of Grand Rapids, Mich.

2,227,771. **Oil Seal** with Variable Shell. J. B. Victor, Oak Park, and W. F. Bernstein, Brookfield, assignors to Victor Mfg. & Gasket Co., Chicago, all in Ill.

2,227,792. **Fountain Brush.** J. J. Norton, Jr., Arabi, assignor to Norton Auto-Flow Brush Corp., Parish of St. Bernard, both in La.

2,227,825. **Hand Swimming Attachment.** C. E. Devermann, Bronxville, N. Y.

2,227,847. **Respirator.** T. J. Shoolman, Brookline, Mass.

2,227,905. **Tumbling Barrel Lining.** E. J. Keenoy, assignor to Raybestos-Manhattan, Inc., both of Passaic, N. J.

2,227,971. **Vacuum Cleaner** with Rubber Vibration Dampener in Suction Nozzle. O. Holm-Hansen, Stratford, Conn., assignor to General Electric Co., a corporation of N. Y.

2,228,052. **Expansion Joint.** L. B. Gardner, Riverside, Ill.

2,228,056. **Cover for Containers, Jars, Etc.,** S. Kazanjian, Woodside, N. Y.

2,228,065. **Woman's Shoe** with Elastic-Bound Top Edge. F. Sbicca, Philadelphia, Pa.

2,228,111. **Sputum Cup and Holder.** K. C. Hamilton, assignor to Milwaukee Lace Paper Co., both of Milwaukee, Wis.

2,228,117. **Capsuling Maching** with Elastic Cups. P. V. Jensen, Copenhagen, Denmark.

2,228,178. **Faucet.** C. B. Mortimer, Lakewood, assignor to Central Brass Mfg. Co., Cleveland, both in O.

2,228,190. **Adjustable Self-Sealing Valve.** H. J. Waddell, Baltimore, O.

2,228,208. **Knitted Fabric** with Elastic Thread Incorporated Therein. J. L. Getaz, Maryville, Tenn., assignor to Scott & Williams, Inc., Laconia, N. H.

2,228,227. **Guiding Means** for Elevators with Pneumatic Tires. W. F. Eames, Westfield, assignor to Westinghouse Electric Elevator Co., Bloomfield, both in N. J.

2,228,238. **Wringer and Driving Apparatus** for Washing Machine. R. J. Anderson, Sidney, O.

2,228,241. **Well Packer.** R. C. Baker, Coalinga, C. E. Burt, and T. M. Ragan, both of Los Angeles, assignors to Baker Oil Tools, Inc., Huntington Park, all in Calif.

2,228,251. **Mercury Switch.** P. S. Bear and H. E. Bucklen, assignors, by mesne assignments, to Bucklen-Bear Laboratories, Inc., all of Elkhart, Ind.

2,228,318. **Aerating Device** for Well Tubing. J. J. Klise, Wooster, O.

2,228,319. **Safety Roll** for Clothes Wringers. C. G. Lundstrom, Des Moines, assignor of one-fourth to A. Anstrom, Boone, both in Iowa.

2,228,334. **Plug Receptacle Construction.** C. W. Abbott, Larchmont, N. Y.

2,228,360. **Windproof Clothespin** with an Elastic Cup Fitting. A. W. Nordeck, Tacoma, Wash.

2,228,368. **Weather Strip.** C. P. and N. C. Schlegel, assignors to Schlegel Mfg. Co., all of Rochester, N. Y.

2,228,384. **High Voltage Discharge Tube.** A. Bouwers and A. Verhoeff, both of Eindhoven, Netherlands, assignors, by mesne assignments, to Hartford National Bank & Trust Co., Hartford, Conn., as trustee.

2,228,404. **Hose Supporter.** J. Saftlas and J. Diamond, Philadelphia, Pa., assignors to J. Saftlas.

2,228,502. **Chamber for Breathing Mixtures of Gases at Low Temperatures.** W. M. Boothby, Rochester, Minn.

2,228,540. **Marking Implement** with Elastic Casing. F. A. Sturm, Paterson, N. Y.

2,228,552. **Valve** for Flushing Tanks. A. C. Arbogast, assignor to Northern Indiana Brass Co., both of Elkart, Ind.

2,228,578. **Garment Holdfast.** R. Mayer and S. Hess, both of Chicago, Ill.

2,228,632. **Bearing Gland Structure.** O. Landis, Bronx, and C. O. Beckmann, Brooklyn, assignors of 75% to Standard Brands Inc., New York, all in N. Y.

2,228,675 and 2,228,676. **Massage Vibrator.** F. L. Renga, assignor to Chicago Electric Mfg. Co., both of Chicago, Ill.

2,228,719. **Swivel Chair Iron** with Rubber Sleeve. H. W. Bolens, Port Washington, Wis.

2,228,766. **Apparatus for Saturating the Fibrous Covering of Wire** Utilizing Rubber Tubing. T. S. Johnson, Irvington, and J. W. Olson, Hastings-on-Hudson, assignors to Anaconda Wire & Cable Co., New York, all in N. Y.

2,228,811. **Discharge Apparatus** for Washing Water Closets. C. Beutin, Buenos Aires, Argentina.

2,228,873. **Electric Blasting Initiator** with Rubber Plug. M. H. English, Pompton Lakes, N. J., and R. R. Nydegger, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,228,878. **Electric Blasting Initiators.** C. R. Johnson, Glen Mills, Pa., and R. R. Nydegger, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,228,912. **Feeding Device** for Clothes Wringers. C. G. Lundstrom, Des Moines, assignor of one-fourth to A. Anstrom, Boone, both in Iowa.

2,228,934. **Massaging Appliance.** E. H. Tjomsland, New York, N. Y.

Dominion of Canada

393,178. **Shoe** with Rubber-Edged Sole. J. Mastrandrea, Bluefield, W. V., U. S. A.
393,181. **Windscreen Wiper.** W. Reed-Lethbridge, Darlingburst, N. S. W., Australia.
393,189. **Seamless Latex Undergarment.** A. N. Spanel, New York, N. Y., U. S. A.
393,210. **Circuit Interrupter.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of K. Bauerschmidt, Berlin-Karlshorst, Germany.
393,251. **Fire Extinguisher.** (Synthetic.) Resistoflex Corp., New York, N. Y., U. S. A., assignee of E. Schnabel, Berlin-Lichterfelde, Germany.
393,307. **Foot Arch Support.** W. T. Porter, St. Catharines, Ont.
393,375. **Rubber Valve Stem and Insert.** Jenkins Bros., Bridgeport, Conn., assignee of F. H. Watson, Jonesboro, Ark., both in the U. S. A.
393,383. **Railway Vehicle Cushioning Mechanism** Utilizing Rubber in Compression. National Malleable & Steel Castings Co., Cleveland, O., assignee of M. P. Blomberg, Hinsdale, Ill., both in the U. S. A.
393,398. **Textile Roll Cover.** (Synthetic.) Sonoco Products Co., assignee of C. H. Campbell, both of Hartsville, S. C., U. S. A.
393,444. **Bathing Cap.** T. J. Howland, Long Branch, N. J., U. S. A.
393,460. **Vehicle Door Checking and Holding Device.** R. I. Schonitzer, Shaker Heights, O.
393,461. **Vehicle Door Check.** R. I. Schonitzer, Shaker Heights, O., U. S. A.
393,464. **Dress Schield.** (Latex.) A. N. Spanel, New York, N. Y., U. S. A.
393,467. **Basting Device** with Rubber Bulb. F. M. Teel, Hazelton, Pa., U. S. A.
393,522. **Propeller Blade Surface Treating Device** Comprising a Rubber-Like Cover Structure and Liquid Distributing Means. (Synthetic.) B. F. Goodrich Co., New York, N. Y., assignee of J. F. Morse and M. L. Taylor, co-inventors, both of Hudson, O., all in the U. S. A.
393,523. **Container Closure** Utilizing Chlorinated Rubber. Ferdinand Gutmann & Co., New York, assignee of J B. Eisen, Yonkers, both in N. Y., U. S. A.
393,533. **Laminated Elastic Fabric Garment and Panel.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of P. L. Mahoney, Jackson Heights, L. I., N. Y., U. S. A.
393,542. **Printing Means.** National Cash Register Co., assignee of H. E. Sheeler and R. O. Engelauf, all of Dayton, O., U. S. A.
393,564. **Well-Logging Electrode** Standard Oil Development Co., Linden, N. J., assignee of C. J. Haynes, Houston, Texas, both in the U. S. A.
393,571. **Windshield Wiper Mount.** Trico Products Corp., assignee of A. C. Scinta, both of Buffalo, N. Y., U. S. A.
393,572. **Wiper Blade Mounting.** Trico Products Corp., Buffalo, assignee of E. C. Horton, Hamburg, both in N. Y., U. S. A.
393,603. **Sound Deadening Supporting Element.** I. L. Haadem, Ostre Aker, Norway.
393,626. **Corded Edge Sheet Material Article** of Chlorinated Rubber. E. G. Overly, Oakmont, Pa., U. S. A.
393,627. **Flexible Coupling** for Tubes. A. L. Parker, Cleveland, O., U. S. A.
393,629. **Game Device.** W. R. Price, Minneapolis, Minn., U. S. A.
393,640. **Exhalation Valve** for Gas Masks. Acushnet Processes Co., Bedford, assignee of P. E. Young, Fairhaven, both in Mass., U. S. A.
393,717. **Seed Separator.** Eddy Seed Cleaners Ltd., assignee of F. C. Dyer (by his attorney, F. F. Dyer), and A. W. Campbell, all of Toronto, Ont.
393,729. **Airplane Brake Mechanism.** Firestone Tire & Rubber Co., Akron, O., assignee of B. H. Shinn, Butler Pa., both in the U. S. A.
393,779. **Motor Support.** Transit Research Corp., assignee of E. H. Piron, both of New York, N. Y., U. S. A.

United Kingdom

528,677 and 528,678. **Insulated Electric Conductors.** Solution Trust, Ltd.
528,755. **Insulated Electric Conductors.** Soc. Alsacienne de Constructions Mecaniques.
528,832. **Inflatable Balls.** J. Wilson and Slazengers, Ltd.
528,838. **Resilient Supports** for Mounting Electronic Valves or Tubes in Electric Apparatus Fabbrica Italiana Magneti Morelli.
528,872. **Resilient Mountings.** Firestone Tire & Rubber Co., Ltd.
529,148. **Elastic-Fluid Turbine Plants.** British Thomson-Houston Co., Ltd.
529,271. **Balls** for Playing Games. J. J. H. Wilkinson.
529,285. **Atomizers.** G. Bardin.
529,303. **Power Wringers.** Lovell Mfg. Co.
529,378 and 529,379. **Wringers.** Lovell Mfg. Co.
529,380. **Insulated Electrical Conductors.** Rockbestos Products Corp.
529,438. **Nursing Bottles Nipples.** E. A. Evans.
529,463. **Windscreen-Wipers** for Rail or Road Vehicles. G. D. Peters & Co., Ltd., and C. H. Cardwell.
529,521. **High-Frequency Electric Conductors.** Felten & Guilleaume Carlswerke A.G.
529,538. **Tubular Resilient Gripping Devices.** Standard Telephones & Cables, Ltd.
529,585 and 529,586. **Wringers.** Lovell Mfg. Co

Germany

698,337. **Conveyer Belt** for Use in Processing Synthetic Rubber. Maschinenfabrik Gg. Keifer, Stuttgart-Feuerbach.
699,693. **Driving Belt.** E. Siegling, Hannover.
699,856. **Elastic Shaft Coupling.** Getefo Gesellschaft fur technischen Fortschritt m.b.H., Berlin.

PROCESS

United States

2,225,877. **Granular Coated Webs.** R. L. Melton, R. C. Benner, and H. P. Kirchner, assignors to Carborundum Co., all of Niagara Falls, N. Y.
2,225,937. **Abrasive Coated Products.** J. A. Williamson, assignor to Carborundum Co., both of Niagara Falls, N. Y.
2,226,768. **Making Hose and Vulcanizing under Internal and External Pressure.** A. Harrison Arlington Heights, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.
2,227,227. **Making Threads, Bands, Strips, and Tapes of Rubber,** by Extruding a Compounded Aqueous Dispersion of Rubber, and Treating with a Coagulating Medium, and Alcoholic Hardening Medium, and a Solution of Aluminum Sulphate. (Latex.) T. L. Sheperd, Portslade, England assignor to Clark Thread Co., a corporation of N. J.
2,227,809. **Making Porous Rubber Articles** by Mixing a Delayed Action Coagulant with Foamed Aqueous Dispersed Rubber, and Placing Mixture in a Mold Coated with a Concentrated Coagulant so that Surface Region is Coagulated before Main Body of Foam. (Latex.) H. W. Greenup and B. R. Whaley, assignors to Firestone Tire & Rubber Co., all of Akron, O.
2,227,969. **Rubber Bearing.** F. L. Haushalter, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,228,211. **Tire Treading.** J. C. Heintz, Lakewood, O.
2,228,212. **Retreading Tires.** J. C. Heintz, Lakewood, O.
2,228,332. **Coating Objects with Polyvinyl Chloride.** G. Wick and A. Iloff, both of Bitterfeld, assignors to I. G. Farbenindustrie A.G., Frankfurt a.M., all in Germany.
2,228,735. **Making Elastic Suede** by Coating Elastic Sheet with Viscous Latex and Flock. L. Spraragen, assignor to Bridgeport Fabrics Inc., both of Bridgeport, Conn.
2,228,797 and 2,228,798. **Telephone Cables.** G. Wassermann, Frankfurt a.M., Germany, assignor to "Le Conducteur Electrique Blinde Incombustible," Paris, France.
2,229,992. **Beaded Dipped Articles from Liquid Latex.** C. H. Fry, assignor to Dean Rubber Mfg. Co., both of North Kansas City, Mo.

Dominion of Canada

393,321. **Forming a Tire Casing Patch** from Cord Fabric. Bowes Seal Fast Corp., assignee of T. W. Mullen, both of Indianapolis, Ind., U. S. A.
393,788. **Tire Cord.** Dunlop Rubber Co., Ltd., and Dunlop Cotton Mills, Ltd., both of London, assignees of J. Anderson, Birmingham, and M. Langstreth, Rochdale, all in England.

United Kingdom

528,684. **Elastic Edging, Bands, Etc.,** C. Shepherd.
528,746. **Gas-Expanded Rubber and Rubber-Like Materials.** Expanded Rubber Co., Ltd., and A. Cooper.
528,781. **Articles Consisting Wholly or Partly of Perforated Rubber Sheet.** International Latex Processes, Ltd.
528,970. **Electric Cables.** E. G. Williams, J. C. Swallow, M. W. Perrin, and Imperial Chemical Industries, Ltd.
529,067. **Rubber Floor Coverings** J. L. Goudsmit.
529,402. **Kneading and Mixing of Rubber and Similar Plastic Substances.** K. Frei and Baker Perkins, Ltd.

MACHINERY

United States

2,225,672. **Multiple-Mold Press** with Stripping Mechanism. C. C. Webb, assignor to Wheeling Stamping Co., both of Wheeling, W. Va.
2,226,034. **Adjustable Jacket** for Tire Vulcanizers. O. J. Warman, Roswell, N. Mex.
2,226,742. **Tire Trimmer.** N. G. Raymond, Detroit, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.
2,227,265. **Hydraulic Molding Press.** J. Lauterbach, Philadelphia, Pa., assignor, by direct and mesne assignments, to Watson-Stillman Co., Roselle, N. J.
2,227,694. **Marking Machine** for Traveling Covered Wire. H. O. Bates, Union, assignor to Okonite Co., Passaic, both in N. J.
2,227,798. **Tire Recapping Table.** E. D. Rihn, Ford City, and E. M. Wheeler, New Kensington, both in Pa., assignors to C. J. Gross, Jacksonville, Fla.
2,228,316. **Tire Recapping Machine.** H. V. James, Denver, Colo.
2,228,442. **Machine for Skiving Laminated Fabric and Sponge Rubber.** J. F. Coleman, Braintree, Mass., assignor to United Shoe Machinery Corp., Borough of Flemington, N. J.
2,228,774. **Tire-Building Apparatus** Including a Mechanism for Wrapping the Fabric Edges around the Bead Core. E. Miller, Jeannette, Pa.

Dominion of Canada

393,188. **Latex Garment and Dipping Form.** A. N. Spanel, New York, N. Y. U. S. A.
393,231. **Hydraulic Press.** Fulton Sylphon Co., assignee of J. V. Giesler, both of Knoxville, Tenn., U. S. A.
393,463. **Dress Shield Making Apparatus.** A. N. Spanel, New York, N. Y., U. S. A.
393,532. **Molding Apparatus** for Rubber Cushions. (Latex.) International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of G. W. Blair and J. F. Schott, co-inventors, both of Mishawaka, Ind., U. S. A.

United Kingdom

528,715. **Apparatus and Process for Continuous Impregnation of Cables, Etc.** W. J. Fraser & Co., Ltd., Callender's Cable & Construction Co., Ltd., F. Peel, and R. S. Vincent.
528,758. **Molds and Method of Forming Inner Tubes for Pneumatic Tires.** Firestone Tire & Rubber Co., Ltd.
528,759. **Apparatus and Methods of Forming Rubber Articles.** Firestone Tire & Rubber Co., Ltd.
528,909. **Molding Apparatus.** Firestone Tire & Rubber Co., Ltd.
529,294. **Means for Vulcanization of Endless Rubber Belts.** T. G. H. Ekstrom.
529,442. **Pressure-Reducing Valves.** India-Rubber, Gutta Percha & Telegraph Works Co., Ltd., J. Tarris, and D. Webb.

Germany

699,048. **Device to Powder Unvulcanized, Calendered Sheet, Etc.,** Hackethal Draht-und Kabel-Werke A.G., Hannover.
699,148. **Vulcanizing Mold.** Semperit Oesterreichisch-Amerikanische Gummiwerke A.G., Vienna.
698,997. **Device to Grind Valves by means of Rubber Suction Cap.** Gummi- & Asbest-Dabrikate Prag & Co., Augsburg.

CHEMICAL

United States

2,225,635. **Vinyl Halide Preparation**—Reacting Acetylene and a Hydrogen Halide in the Vapor Phase in the Presence of a Solid Complex Salt of a Mercuric Halide and an Alkali Metal Halide. (Synthetic.) A. B. Japs, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,226,517. **Producing Rubber or Rubber-Like Masses from Latex** by Incorporating in as Latex Paraldehyde or Metaldehyde and an Unpolymerized Aldehyde (Acetaldehyde or Propionaldehyde) to Reduce the Affinity of the Rubber Particles for Water. W. Binns, Bradford, England.
2,226,534. **Accelerator**—Aldehyde Derivative of an Amino Hydroxy Propane in Which Amino Radicals Are Primary Amino Radicals or Secondary Aliphatic Amino Radicals. J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,226,541 **Rubber-Neoprene Cement**—Prepared by Dissolving Rubber in Gasoline, Dissolving Neoprene in Amyl Acetate and Mixing the Solutions. (Synthetic.) A. W. Browne, Akron, O., assignor to B. F. Goodrich Co., New York.
2,226,590. **Electrical Insulating Composition** Comprising Rubber Having Colloidal Cellular Structure In Which an Isobutylene Polymer of Molecular Weight above 2,000 Is Homogeneously and Intracellularly Dispersed. (Synthetic.) W. H. Smyers, Westfield, N. J., assignor to Standard Oil Development Co., a corporation of Del.
2,226,771. **Antioxidant**—Reaction Product of an Amino Diaryl Ether and an Aliphatic Ketone. J. R. Ingram, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,226,803. **Antioxidant**—Composite Condensation Product of One Mol of a Halogenated Aldehyde and One to Three Mols of an Aromatic Amine with at least One Hydrogen Atom in the Amino Group. W. C. Calvert, Chicago, Ill., assignor to Wingfoot Corp., Wilmington, Del.

2,226,938. **Vulcanizing Rubber to Zinc or Cadmium Metal** (in the Form of Wire) by Immersing the Metal in an Acidified Solution of Copper Sulphate and Ammonium Molybdate and Vulcanizing Rubber to the Coated Metal. B. L. McCarthy, Buffalo, assignor to Wickwire Spencer Steel Co., New York, both in N. Y.

2,226,984. **Accelerator**—Condensation Product of Phenylimino Carbon Dichloride with a Disubstituted Dithiocarbamic Acid. A. W. Sloan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,227,154. **Polyvinyl Halide** Plasticized with an Ester of an Aliphatic Dibasic Acid of the Class $C_nH_{2n-2}O_4$, Where *n* is at least 6, and an Alcohol of the Class $C_6H_5(CH_2)_nOH$. (Synthetic.) J. J. Russell, Schenectady, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,227,478. **Preparing Vinyl Derivatives** by Reacting Acetylene in the Presence of Cuprous Salt Catalyst and a Carboxylic Acid as a Solvent. (Synthetic.) A. Wolfram, Frankfurt a.M.-Rodelheim, H. Jockusch, Bad Soden in Taunus, and A. Perlick, Hollriegels Kreuth, assignors to I. G. Farbenindustrie A.G., Frankfurt a.M., all in Germany.

2,227,517. **Plastic Polymer of a Compound of the General Formula** $CH_2=\underset{X}{\underset{|}{C}}-\underset{R}{\underset{|}{C}}=CH_2$ Where X Is Halogen and R Is Hydrogen or a Hydrocarbon Radical, Polymerized in Acid Emulsion; The Polymer Is Capable of Being Cured to a Highly Elastic Product and Has in Chemical Combination with It a Small Amount of an Unpolymerizable Acid-Stable Organic Modifying Agent Capable of Forming an Addition Product with Compounds of the above Type during Polymerization. (Synthetic.) H. W. Starkweather, New Castle County, and A. M. Collins, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, all in Del.

2,227,518. **Plastic Polymer** of a Compound of General Formula $CH_2=\underset{X}{\underset{|}{C}}-\underset{R}{\underset{|}{C}}=CH_2$ Where X Is Halogen and R is Hydrogen or a Hydrocarbon Radical, Polymerized in Acid Emulsion; The Polymer Is Capable of Being Cured to a Highly Elastic Product and Has in Chemical Combination with It a Small Amount of an Unpolymerizable Acid-Stable Compound Containing the Nucleus$-\underset{|}{C}=\underset{|}{C}-\underset{|}{C}=O$ Which Is Capable of Forming an Addition Product with Compounds of the General Formula during Polymerization. (Synthetic.) H. W. Starkweather, New Castle County, and A. M. Collins, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, all in Del.

2,227,519. **Plastic Polymer** of a Compound of the General Formula $CH_2=\underset{X}{\underset{|}{C}}-\underset{R}{\underset{|}{C}}=CH_2$ Where X Is Halogen and R Is Hydrogen or a Hydrocarbon Radical, Polymerized in Acid Emulsion; The Polymer Is Capable of Being Cured to a Highly Elastic Product and Has, in Chemical Combination, a Small Amount of an Aromatic Sulphonic Acid. (Synthetic.) H. W. Starkweather, New Castle County, and A. M. Collins, assignors to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, all in Del.

2,227,533. **Cork Composition,** Comprising 150 to 300 Grams of Hydraulic Cement; 100 to 200 Grams of Mineral Aggregate; 15 to 20 Grams of Comminuted Cork; and from 40 to 165 Grams of One of the Following: Rubber Deposited from Rubber Latex, Reclaimed Rubber, Raw Rubber Polymerized Chlorabutadiene, and Olefin Polysulphide Reaction Product. (Synthetic.) G. B. Cooke, assignor to Crown Cork & Seal Co., Inc., both of Baltimore, Md.

2,227,637. **Impregnating and Insulating Material,** Comprising Chlorinated Diphenyl and Polyvinylcarbazole. (Synthetic.) R. Engelhardt, Leverkusen—I. G. Werk, assignor to I. G. Farbenindustrie A.G., Frankfurt a.M., both in Germany.

2,227,777. **Rubber Derivatives** Prepared by Reacting Maleic Anhydride with Rubber in Solution at 70 to 100° C. for Several Hours. E. H. Farmer, Radlett, and J. Wheeler Barrett, Knockholt, assignors to British Rubber Producers' Research Ass'n., London, all in England.

2,227,797. **Resinous Products** Prepared by Treating Rubber with Maleic Anhydride and a Phenol at Elevated Temperature and Subsequently Condensing the Reaction Moisture with an Aldehyde. C. A. Redfarn and P. Schidrowitz, assignors to British Producers' Research Assn., all of London, England.

2,227,900. **Bonding Natural Rubber** to a Butadiene Interpolymer by Vulcanizing with a Polymer of Butadiene in between. B. J. Habgood and L. B. Morgan, both of Blackley, Manchester, England, **assignors to Imperial** Chemical Industries, Ltd., a corporation of Great Britain.

2,227,957. **Plasticizer** — Bis Cyclohexylidene Azine. W. F. Busse, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,227,983. **Transparent Rubbery Sheet** of Polyvinyl Acetal Resin Containing Ethylene Glycol Dibenzyl Ether. H. B. Smith, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,227,991. **Bonding Agent** for Bonding Polymerized Chloroprene to Metal, Comprising a Halogen-Containing Rubber Derivative and a Vulcanizing Agent. (Synthetic.) H. A. Winkelmann, Chicago, Ill., and E. W. Moffett, Milwaukee, Wis., assignors to Marbon Corp., Gary, Ind.

2,228,429. **Pneumatic Drill Lubricant** Comprising Lubricating Oil and Blown Rape Seed Oil with 0.1 to 0.5% Isobutylene Polymer. (Synthetic.) D. L. Wright Elizabeth, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,228,657. **Artificial Dispersions of Rubber** Prepared by Adding Water to a Plasticized Rubber Mass Containing the Saponaceous Reaction Product of a Soap-Forming Acid and an Alkali Silicate. R. H. Ewart, Naugatuck, Conn., assignor, by mesne assignments, to Dispersions Process, Inc., New York, N. Y.

2,228,752. **Separation of Divinylacetylene and Ethinylbutadiene and the Preparation of the Latter in Purified Form.** (Synthetic.) A. S. Carter, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

Dominion of Canada

393,205. **Rubber Compounded with Coal Tar Oil** Containing Substantial Portions of Monomethyl and Dimethyl Naphthalene Fractions and Being Substantially Free of Oil Constituents Boiling above about 300° C. Barrett Co., New York, N. Y., assignee of K. H. Engel, West Englewood, N. J., both in the U. S. A.

393,229. **Bonding Rubber to Metal** by Incorporating a Small Amount of a Sulphide of Phosphorous into the Rubber. Dominion Rubber Co., Ltd., Montreal P. Q., assignee of E. L. Scholl, Detroit, Mich., U. S. A.

393,230. **Bonding Rubber to Metal** by Incorporating Red Phosphorous and an Activator Therefor (an Inorganic Halide) into the Rubber. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. L. Scholl and A. W. Oakleaf, both of Detroit, and J. D. Morron, Grosse Pointe Park, co-inventors, all in Mich., U. S. A.

393,274. **In Producing Vinyl Chloride by Leading Acetylene and Hydrogen Chloride Over Active Carbon,** the Step Which Comprises Supplying Mercury Periodically or Continuously. (Synthetic.) J. Boesler and E. Eberhardt, both of Ludwigshafen-on-Rhine, W. Sandhass, Mannheim, and R. Stadler, Heidelberg, co-inventors, all in Germany.

393,275. **Butadiene Production**—Treating Vinylacetylene with Amalgams of Alkali Metals in Presence of Substances (Water or Alcohols) Which Develop Hydrogen with the Amalgams. (Synthetic.) R. Stadler, Heidelberg, K. Ackermann, Mannheim, and E. Lehrer, Ludwigshafen-on-Rhine, co-inventors, all in Germany.

393,388. **Rubber-Like Elastic Composition** (Substantially Insoluble) Made by Dissolving an Ester of Polyacrylic Acid and a Monohydric Aliphatic Alcohol (not More Than Two Carbon Atoms) in a Suitable Solvent and Treating with Finely Divided Copper. (Synthetic.) Resistoflex Corp., New York, N. Y., U. S. A., assignee of E. Schnable, Berlin-Licterfelde, Germany.

393,481. **Rubber Insulating Composition** Comprising (in Parts by Weight): Deproteinized Rubber, 33-38; Finely Divided Zinc Oxide, 28-33; Finely Divided Clay, 26-31; Antioxidant, 1-3; Plasticizer, 0.5-2.5; and Thiuram Polysulphide or Tetramethylthiuram Disulphide, 1.0-2.5. Canadian General Electric Co., Ltd. Toronto, Ont., assignee of E. W. Schwartz, Bridgeport, and M. H. Savage and F. C. Spargo, both of New Haven, co-inventors, all in Conn., U. S. A.

393,561. **Producing High Molecular Weight Polymers of Isobutylene by Polymerizing** below—10° C. in a Bath of a Liquefied Normally Gaseous Hydrocarbon (Other Than Isobutylene) and a Halide Catalyst. (Synthetic.) Standard Oil Development Co., Linden, assignee of L. A. Bannon, Roselle, both in N. J., U. S. A.

393,597. **Vinyl Halide Manufacture** — Reacting Hydrogen Halide and Acetylene in Presence of a Polyhydric Aliphatic Alcohol or a Halohydrin Thereof in Which a Mercuric Halide Is Dissolved. (Synthetic.) I. G. Farbenindustrie A.G., Frankfurt a.M., assignee of C. Jung, Rheinfelden in Baden, both in Germany.

393,600. **Improving the Properties of Products Made from Polyvinyl Chloride and Interpolymers of Vinyl Chloride and Styrene** by Applying Heat and Pressure (without Using Pressure to Temperatures of between 220 and **320° C.) and then Stretching at Lower Temperatures.** (Synthetic.) H. Fikentscher and H. Jacqué, co-inventors, both of Ludwigshafen-on-Rhine, Germany.

393,812. **Softeners for Polyvinyl Compounds**—Organic Plasticizers Containing at Least One Aromatic Group and at Least One Aliphatic Group with a Carbon Chain of at Least 10 Carbon Atoms. Siemens-Schuckertwerke A.G., Berlin-Siemensstadt, assignee of H. Muller, Berlin-Wilmersdorf, both in Germany.

United Kingdom

528,691. **Dihalogenobutanes.** (Synthetic.) E. I. du Pont de Nemours & Co., Inc.,

529,126. **Self-Set Magnesium Carbonate Composition.** L. Mellersh-Jackson, (Plant Rubber & Asbestos Works).

529,127 and 529,128. **Magnesium Carbonate Composition.** Plant Rubber & Asbestos Works.

529,246. **Compounding Latex Mixtures.** British Rubber Producers' Research Ass'n., G. Martin, and W. G. Wren.

529,299. **Electrical Insulating Materials.** Pirelli-General Cable Works Ltd., B. O. Ashford, and A. N. Coffin.

Germany

696,738. **Microporous Rubber Vulcanizates.** Accumulatoren-Fabrik A.G., Berlin.

698,662. **Transparent, Translucent or Light-Colored Rubber Goods.** Metallgesellschaft A.G., Frankfurt a.M.

UNCLASSIFIED

United States

21,670. (Reissue.) **Supporting Bracket** for Rubber-Hose Shower or Spray Devices. J. E. Conklin, deceased, Brooklyn, N. Y., F. H. Michaelis, executor.

2,225,611. **Wringer Reset.** N. L. Etten, Waterloo, Iowa.

2,225,674. **Tire Pressure Indicator.** W. S. West, Chicago, Ill.

2,225,675. **Combination Valve Cap and Tire Gage Device.** W. S. West, Chicago, Ill.

2,225,828. **Non-Skid Track.** C. H. Godschall, Glenside, assignor to Philco Corp., Philadelphia, both in Pa.

2,226,109. **Metal Container.** C. C. Soper, Kent, assignor by mesne assignments, to Firestone Tire & Rubber Co., Akron, both in O.

2,226,135. **Cord Stretching and Winding Machine.** W. A. Newton, Jr., Winnsboro, S. C., and D. T. Austin, Jr., Hogansville, Ga., assignors to United States Rubber Co., New York, N. Y.

2,226,757. **Tire Tool.** E. A. Ewell, Bellevue, assignor of 35/100 to R. J. Wimberley, Burkburnett, both in Tex.

2,227,074. **Audible Signal** as a Tire Pressure Indicator. A. F. Erickson, Chicago, Ill.

2,227,096. **Clothes Wringer.** T. J. Litle, Jr., assignor to Easy Washing Machine Corp., both of Syracuse, N. Y.

2,227,566. **Warming System** for Syringes. R. C. Angell, Prince Bay, N. Y., assignor to S. S. White Dental Mfg. Co., a corporation of Pa.

2,227,782. **Non-Skid Device** for Tires. D. S. Kennedy, Longparish, Andover, England.

2,227,802. **Automatic Tire Pressure Switch.** P. van Vleck, Greenville, S. C.

2,228,086. **Wheel Tire Rim Assembly Press.** J. S. Rodgers, assignor to Rodgers Hydraulic Inc., both of Minneapolis, Minn.

2,228,423. **Wheel and Rim.** L. L. Ticktin, Evanston, and R. W. Ekberg, Chicago, both in Ill.

2,228,430. **Apparatus for Applying Decoration** to Eraser-Tipped Pencils. H. Zoll, Elmhurst, assignor to Eberhard Faber Pencil Co., Brooklyn, both in N. Y.

2,228,488. **Agricultural Tire Rim Mounting.** E. L. Rietz, Riverside, Ill., assignor to International Harvester Co., a corporation of N. J.

2,228,704. **Carbon Black.** H. H. Offutt, Winchester, assignor to Godfrey L. Cabot, Inc., Boston, both in Mass.

2,228,984. **Pneumatic Tire Valve.** L. C. Broecker, assignor to Bridgeport Brass Co., both of Bridgeport, Conn.

Dominion of Canada

393,280. **Tire Pressure Indicator.** J. St. Amand, Rimouski, and J.-P. Comeau, Mont-Joli, co-inventors, both in P. Q.

393,711. **Asbestos Yarn.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. A. Gibbons, Montclair, N. J., U. S. A.

United Kingdom

529,066. **Tools for Removing Sheath from Electric Cables.** G. M. Baillie.

529,239. **Safety Devices** for Wringers. Lovell Mfg. Co.

529,423. **Girdles for Pneumatic Tires of Road-**

(Continued on page 96)

Market Reviews

CRUDE RUBBER

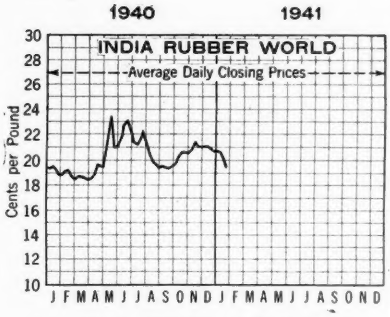
Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	Nov. 30	Dec. 28	Jan. 4	Jan. 11	Jan. 18	Jan. 25
"New" Standard						
Jan.	20.38	20.20	20.25	20.12	19.48	19.42
Feb.	.....	.....	20.19	20.09	19.50	19.42
Mar.	20.13	20.05	20.14	20.06	19.52	19.42
July	19.70	19.70	19.80	19.76	19.30	19.22
Sept.	19.60	19.60	19.68	19.60	19.15	19.15
Dec.	.....	.....	19.53	19.45	19.00	19.05
No. 1 Standard						
Jan.	20.33	20.20	20.25	20.12	19.48	19.42
Mar.	20.13	20.05	20.14	20.06	19.52	19.42
May	19.93	19.90	19.99	19.93	19.41	19.30
Volume (tons) per week						
"New" Standard	160	220	220	290	1,060	1,280
No. 1 Standard	7,070	1,370	1,080	1,040	2,080	2,690

NEWS of heavier rubber supplies in this country and the lack of buying support were the reasons cited for the sharp decline in the rubber market during January. March futures (old contract), which closed at 20.12¢ per pound on December 31, slumped sharply after mid-January to close at the much lower level of 19.10¢ per pound on January 22. Thereafter the market was stronger and the closing price on January 29 was 19.61¢ per pound.

December U. S. rubber consumption of 56,539 tons, the second highest monthly figure on record, brought total U. S. consumption for the year up to 618,349 long tons, an all-time high record. During January rubber consumption continued at a high level, and it is expected that the monthly total may reach an all-time high, possibly 60,000 tons. An average of 55,000 tons monthly is anticipated for the first quarter of this year. Two major factors point toward increased rubber usage this year—increased national defense needs and greater consumer purchasing power. These factors, however, may be offset by other developments arising from the current war. For example, new equipment tire and other automotive rubber business would decline if passenger car production were curbed because of war orders. There is also the possibility of government restrictions on rubber usage should our crude shipments be interrupted. Aside from these uncertainties, 1941 rubber consumption should be above the 600,000-ton mark again and probably above the 1940 record.



New York Outside Market—Spot No. 1-X Ribbed Smoked Sheets

The largest amount of rubber ever imported into this country during one month arrived in December, 97,984 long tons. The previous record was established in September, 1940, with 78,973 tons gross imported. Reexports for December were only 250 long tons.

According to the Department of Commerce, rubber trade routes have changed rapidly. During the first quarter of 1939 only 4.7% of all our rubber imports were routed via the Panama Canal, while the bulk was shipped via the Suez Canal and the Cape of Good Hope. During the third quarter of last year, however, 83.9% arrived through the Panama Canal and only 7.7% were routed via the Suez and the Cape of Good Hope.

The Legislative Council of Singapore enacted on January 20 a new special war tax of 2½% *ad valorem* on rubber exports. Similar legislation is expected throughout British Malaya.

On January 16, Jesse Jones, Federal Loan Administrator, submitted a letter to the President and Congress of the United States, reporting upon activities of the Reconstruction Finance Corp. in connection with the national defense program. According to this letter, the Rubber Reserve Co. with the approval of the RFC has agreed with the International Rubber Regulation Committee to purchase up to 430,000 tons of crude rubber, costing approximately $190,000,000. [This amount is 100,000 tons more than the total of 330,000 tons provided for in the agreements announced on July 1 and August 17.] Mr. Jones stated that 52,516 tons have been delivered, 20,139 tons are in transit, 16,343 tons await shipment, and that the balance should be accumulated during 1941. He also pointed out that the rubber industry has agreed to carry not less than 150,000 tons to meet its current needs and that as of December 31 it had accumulated 206,000 tons. Also, the Commodity Credit Corp. has 80,000 tons on hand, 10,000 tons afloat, and 5,000 tons awaiting shipment, acquired in exchange for cotton under the 1939 barter agreement with Great Britain as reported on January 16.

New York Outside Market

The outside market was active during January, with dealers and importers reporting demand from factory accounts, particularly for forward delivery. Although shipment offerings from the Far East were rather plentiful, they were generally too high for the local market. In company with rubber futures, the market declined sharply last month. No. 1-X ribbed smoked sheets, in cases, which held steady at 20¾¢ per pound from December 30 to January 8, dropped sharply to close at 19⅜¢ per pound on January 22. The closing price on January 29, was 19¾¢ per pound with the market stronger. Latex crepe grades were often quoted ⅛¢ above No. 1-X, in cases, during the month.

(*New York Outside Market Rubber Quotations appear on page 92.*)

Rubber and Canvas Footwear Statistics

	Thousands of Pairs		
	Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940			
Jan.	15,018	5,044	6,389
Feb.	15,319	5,062	4,761
Mar.	15,656	4,869	4,532
Apr.	16,881	5,128	3,902
May	18,095	5,075	3,862
June	18,886	4,528	3,737
July	17,641	3,323	4,567
Aug.	16,386	4,583	5,808
Sept.	14,232	4,046	6,200
Oct.	13,365	5,105	5,971
Nov.	11,878	5,146	6,633

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.
Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

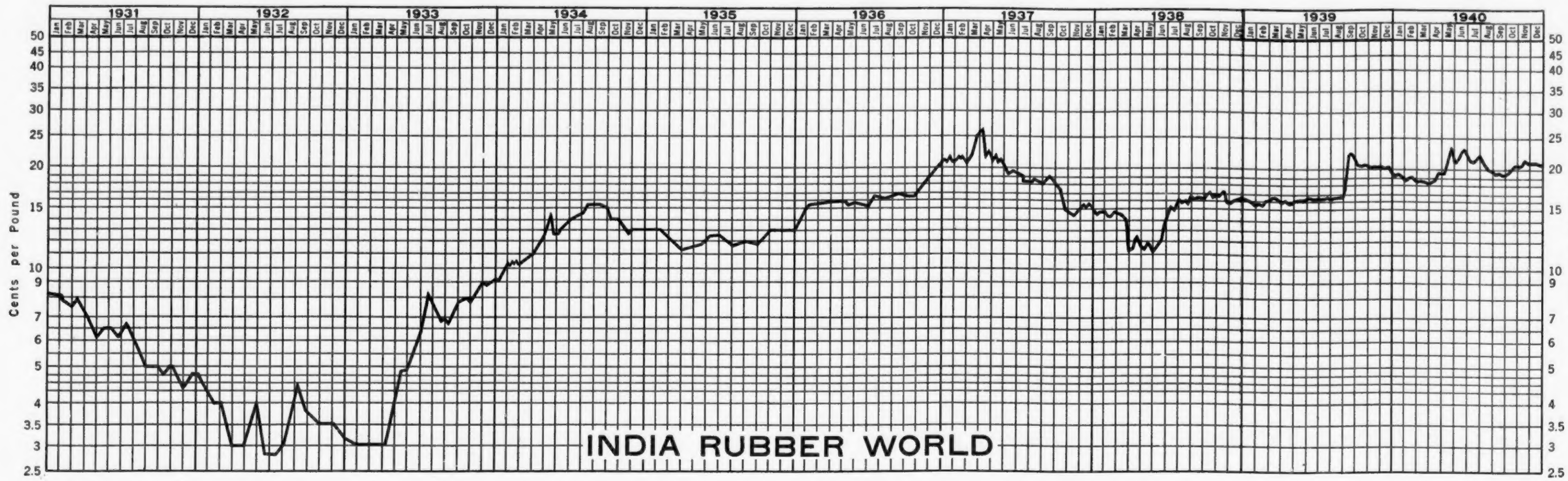
New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	Dec., 1940 30	31	January, 1941 1†	2	3	4	6	7	8	9	10	11	13	14	15	16	17	18	20	21	22	23	24	25
No. 1-X R.S.S. in cases*	20¾	20¾	..	20¾	20¾	20¾	20¾	20¾	20¾	20⅝	20⅝	20⅝	20½	20¼	20⅛	20⅛	19⅞	19⅞	19⅝	19½	19⅜	19⅜	19½	19⅝
No. 1 Thin Latex Crepe	20¾	20¾	..	20¾	20¾	20¾	20¾	20¾	20¾	20⅝	20⅝	20⅝	20½	20⅜	20¼	20¼	20	20	19¾	19⅝	19½	19½	19⅝	19¾
No. 2 Thick Latex Crepe	20¾	20¾	..	20¾	20¾	20¾	20¾	20¾	20¾	20⅝	20⅝	20⅝	20½	20⅜	20¼	20¼	20	20	19¾	19⅝	19½	19½	19⅝	19¾
No. 1 Brown Crepe	19	19	..	19	19	19	19	19	19	18⅞	18⅞	18⅞	18¾	18½	18⅜	18⅜	18⅛	18⅛	17⅞	17¾	17¾	17¾	17⅞	18
No. 2 Brown Crepe	18¾	18¾	..	18¾	18¾	18¾	18¾	18¾	18¾	18⅝	18⅝	18⅝	18½	18¼	18⅛	18⅛	17⅞	17⅞	17⅝	17½	17½	17½	17⅝	17¾
No. 2 Amber	19	19	..	19	19	19	19	19	19	18⅞	18⅞	18⅞	18¾	18½	18⅜	18⅜	18⅛	18⅛	17⅞	17¾	17¾	17¾	17⅞	18
No. 3 Amber	18¾	18¾	..	18¾	18¾	18¾	18¾	18¾	18¾	18⅝	18⅝	18⅝	18½	18¼	18⅛	18⅛	17⅞	17⅞	17⅝	17½	17½	17½	17⅝	17¾
Rolled Brown	15⅜	15⅜	..	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜	15¼	15¼	15¼	15⅛	14⅞	14¾	14¾	14½	14½	14¼	14⅛	14¾	14¾	14⅞	15

*No 1 Ribbed Smoked Sheets are ⅛¢ lower than No. 1-X R.S.S. in cases quoted here. †Holiday.

New York Outside Market—Low and High Spot Rubber Prices in Cents per Pound—1932-1940

	January	February	March	April	May	June	July	August	September	October	November	December
1932, No. 1 thin latex crepe	4¾/5¼	4-3/16/4⅞	4-3/16/4⅝	3-13/16/4¼	3-11/16/5	3-3/16/3-11/16	3-3/16/4	4/5-1/16	4/5⅛	3⅞/4¼	3⅞/4⅛	3-13/16/3-15/16
Ribbed smoked sheet	4¼/4¾	3-3/16/4¼	3/3⅝	2-13/16/3⅛	2¾/4-3/16	2⅝/2¾	2⅝/3-3/16	3-3/16/4½	3-7/16/4-3/16	3-3/16/3-11/16	3-5/16/3-3/16	3-3/16/3⅜
Upriver fine	5½/5¾	5¼/5½	5/5¼	5/5¼	5½/5¾	5½/....	5½/5¾	5¾/7½	6½/7¾	7¼/7¾	7¼/7½	6½/7½
1933, No. 1 thin latex crepe	3⅝/3⅞	3⅝/3-13/16	3⅝/3⅞	3¾/5	5-3/16/6⅞	5⅞/7-3/16	7⅜/10½	7½/8¾	7½/9⅛	7¾/8⅞	8½/10⅛	9⅞/10½
Ribbed smoked sheet	2-13/16/3¼	2⅞/3	2-13/16/3-3/16	2-13/16/4¼	4-3/16/6⅛	5¼/6-7/16	6½/9¾	6⅝/7⅞	6⅝/8¼	6⅞/8	7¾/9⅛	8½/9-3/16
Upriver fine	6/6¼	6/....	6/....	6/6½	6¼/8¼	7½/8½	8¼/11	9¾/11	8¾/9¾	8/9¼	8/9	9/....
1934, No. 1 thin latex crepe	10¼/11¾	11¾/12¼	11⅞/13¼	13⅛/15¾	14/17⅛	14¾/16	15⅞/16⅝	16¼/17⅛	15¾/16¾	13¾/15½	13⅜/14¼	13¼/13⅞
No. 1 ribbed smoked sheet	8¾/10⅜	9-13/16/10¾	10-5/16/11⅝	11¼/13⅝	12/15¼	12¾/14⅛	13-13/16/14⅞	14-11/16/15¾	14¾/15⅞	13/14½	12-9/16/13⅜	12¾/13⅛
Upriver fine	8¾/9	9/9¾	9¾/10¼	10¼/11	11/13¼	11/12	11¼/12	11½/11¾	10¾/11¾	10/10¾	9¾/10	9½/9¾
1935, No. 1 thin latex crepe	12¾/14⅛	13/13¾	10⅝/12⅞	10⅞/12¼	11⅝/13	12½/13-1/16	11-13/16/12¾	11-13/16/12⅜	11½/12¼	12/13¾	13-5/16/13-11/16	13⅛/13-15/16
No. 1 ribbed smoked sheet	12⅜/13-11/16	12-9/16/13⅜	10⅜/12-9/16	10-13/16/12	11⅜/12¾	12-3/16/12-13/16	11¾/12-7/16	11-15/16/12¼	11¼/12	11¾/13½	12-13/16/13⅜	12¾/13-9/16
Upriver fine	9¼/9¾	9½/9¾	9/9½	8¾/9⅝	9¼/9½	9½/10½	9¼/10	9¾/10¼	9⅞/10½	10½/12¼	12/13½	12/13½
1936, No. 1 thin latex crepe	13⅞/15-7/16	15-7/16/16-5/16	16-1/16/16-7/16	16-1/16/16-7/16	15⅝/16-3/16	15-13/16/16½	16½/17-1/16	16-11/16/16-13/16	16⅞/17¼	16-13/16/17-13/16	17¾/19-5/16	19¼/24⅛
No. 1 ribbed smoked sheet	13½/15-1/16	15-1/16/15¾	15⅝/16-1/16	15-13/16/16⅛	15-5/16/15-13/16	15⅝/16-3/16	16-3/16/16-11/16	16⅛/16-7/16	16¼/16⅝	16-5/16/17-1/16	17⅛/18-9/16	18½/23
Upriver fine	12/13	13/16½	15¾/16¾	16¾/18¾	17½/18½	17¼/17½	17½/17⅞	17⅞/20½	20½/21	20½/21½	21½/23¾	23½/25¼
1937, No. 1 thin latex crepe	21-13/16/23⅝	22⅛/24½	24-7/16/31	24⅞/31½	25/26½	22¼/25⅝	20/22⅝	19¼/20	18½/20-5/16	15½/18¾	14½/16	14-13/16/15-13/16
No. 1 ribbed smoked sheet	20-5/16/22⅜	20-13/16/21⅞	21-13/16/26⅞	20⅞/26⅞	20⅜/22½	18½/20-5/16	18-3/16/19⅝	18-3/16/18-11/16	17½/19-3/16	14¾/17¾	14/15-5/16	14½/15-9/16
Upriver fine	24/25	25/....	22/25	22/22¾	22/22¾	20/22	20/20¼	19½/20¼	19½/19¾	16½/19¾	14½/16½	15/15¼
1938, No. 1 thin latex crepe	14-7/16/15⅝	14¾/15¾	11⅛/15-13/16	11⅞/13⅞	12-3/16/13⅛	12⅜/15-11/16	15⅝/17	16-9/16/17⅜	16⅛/17⅜	17-7/16/18⅛	16-9/16/18¼	16⅞/17⅝
No. 1 ribbed smoked sheet	14-1/16/15-3/16	14-5/16/15	10¼/14⅞	10⅞/12¾	11⅛/12-1/16	11¼/14-11/16	14¾/16⅛	15-11/16/16-9/16	15-5/16/16-9/16	16⅝/17-3/16	15-9/16/17¼	15⅞/16⅝
Upriver fine	14¼/15	12¾/14¼	10¾/12¾	10¾/11	11/11¼	11¼/13¾	13¾/15	15/15¾	15¾/....	15⅜/15¾	15½/....	14⅛/15½
1939, No. 1 thin latex crepe	15-3/16/17-5/16	15-7/16/18-3/16	17/18-5/16	17/17⅞	17-9/16/18⅜	18/18-5/16	18⅛/18-9/16	18/18-9/16	21/26	21½/23¾	22½/23¾	20½/23
No. 1 ribbed smoked sheet	15⅛/16-5/16	15⅜/16¾	15⅞/16-13/16	15¾/16-1/16	15-15/16/16-11/16	16-5/16/16⅝	16-7/16/16⅞	16-9/16/16⅞	19½/25	20¼/21½	20¼/20¾	19¼/20¾
Upriver fine	13⅛/14⅛	13⅛/13⅝	13⅝/13¾	13⅝/....	13⅝/14¼	14¼/14⅜	14¼/....	14¼/14⅜	14⅜/....	..../....	..../....	18¼/....
1940, No. 1 thin latex crepe	19½/20¾	18⅞/20	18¾/19⅜	18¾/20	19¼/25	20½/23½	21/22¼	19/21¼	19¼/19⅝	19⅝/20¾	20⅝/21½	20⅜/21
No. 1-X ribbed smoked sheet	19/19⅝	18⅜/19¼	18¼/18⅞	18⅜/20	19¼/25	20½/23½	21/22¼	19¼/20¾	19⅜/19¾	19¾/20¾	20⅝/21½	20⅝/21
Upriver fine	18¼/18¾	17⅞/18¼	17⅜/17⅞	17⅜/17¾	17¾/21⅞	19⅜/21⅜	19⅛/19⅞	18⅞/19⅛	17⅞/18⅞	15⅞/16⅞	16⅞/17⅞	17⅝/17¾



New York Outside Market—Closing Prices Ribbed Smoked Sheets—1931-1940

COMPOUNDING INGREDIENTS

THE movement of compounding ingredients into consumption for the rubber industry during January was reported to be in somewhat greater volume than during the previous month. Market activity is expected to continue at a high level at least through the first quarter.

CARBON BLACK. Domestic demand was reported at a somewhat higher level during January; while exports continued below normal. Total shipments for January may exceed production figures. Stocks on hand by producers at the end of 1940 totaled 161,000,000 pounds, against 124,000,000 pounds on December 31, 1939.

FACTICE OR RUBBER SUBSTITUTE. The demand continued at a good level, with prices generally steady.

LITHARGE. The demand, although reflecting seasonal sluggishness, was reported to be running ahead of the same period of last year. The price is steady and unchanged. Domestic sales in 1940 were reported by the Bureau of Mines at 88,300 tons, compared with 89,518 tons for 1939. Exports for the first 11 months of 1940 were 1,470 tons, against 2,077 tons for 12 months in 1939.

LITHOPONE. A good demand was reported. The price was steady at the higher level established on January 2. Domestic sales, according to the Bureau of Mines, aggregated 146,600 tons in 1940, against 142,759 tons in 1939. Exports for the first 11 months of 1940 were 12,010 tons, against 4,845 tons for 12 months in 1939. Imports declined from 2,641 tons in 1939 to none in 1940.

RUBBER CHEMICALS. Sales to the rubber industry were reported to be running slightly higher than the average of the last quarter of 1940. Prices are generally steady.

RUBBER SOLVENTS. Contract offerings were well maintained, but spot demand was slack. Prices are firm, but unchanged.

TITANIUM PIGMENTS. The demand from the rubber industry remained at an unusually high level. Prices are steady at the higher quotations established January 2 and reported here last month.

ZINC OXIDE. Shipments were in large volume during January. Prices are steady. Domestic sales of lead-free zinc oxide for 1940, as reported by the Bureau of Mines, were 112,400 tons, against 114,552 tons in 1939. Exports of zinc oxide were 3,085 tons for 11 months in 1940, against 3,485 tons for the full year of 1939. Imports were 307 tons for 11 months of 1940, against 1,551 tons for 12 months of 1939.

Current Quotations*

Abrasives

Pumicestone, powdered	*lb.*	$0.03	/$0.035
Rottenstone, domestic	*lb.*	.03	/ .035
Silica, 15	*ton*		

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	*ton*	20.00	
Litharge (commercial)	*lb.*	.08	

Accelerators, Organic

A-1	*lb.*	$0.24	/$0.30
A-10	*lb.*	.31	/ .35
A-19	*lb.*	.52	/ .65
A-32	*lb.*	.70	/ .80
A-77	*lb.*	.42	/ .55
A-100	*lb.*	.42	/ .55
Accelerator 49	*lb.*	.40	/ .42
737	*lb.*	.42	/ .43
737-50	*lb.*	.25	/ .26
808	*lb.*	.70	/ .72
833	*lb.*	1.15	
Acrin	*lb.*	.60	
Aldehyde ammonia	*lb.*	.70	
Altax	*lb.*	.55	/ .60
B-J-F	*lb.*	.50	/ .55
Beutene	*lb.*	.70	/ .75
Butyl Eight	*lb.*	.98	/ 1.00
Zimate	*lb.*	2.15	
C-P-B	*lb.*	2.00	
Captax	*lb.*	.50	/ .55
Crylene	*lb.*	.40	/ .47
Paste	*lb.*	.30	/ .36
D-B-A	*lb.*	2.00	
Delac A	*lb.*	.40	/ .50
O	*lb.*	.40	/ .50
P	*lb.*	.40	/ .50
Di-Esterex-N	*lb.*	.60	/ .70
DOTG (Di-ortho-tolyguanidine)	*lb.*	.44	/ .46
DPG (Diphenylguanidine)	*lb.*	.35	/ .45
El-Sixty	*lb.*	.50	/ .65
Ethylideneaniline	*lb.*	.42	/ .43
Ethyl Zimate	*lb.*	2.15	
Formaldehyde P.A.C.	*lb.*	.06	
Formaldehydeaniline	*lb.*	.31	
Formaldehyde-para-toluidine	*lb.*	.52	/ .54
Guantal	*lb.*	.40	/ .50
Hepteen	*lb.*	.35	/ .40
Base	*lb.*	1.35	/ 1.50
Hexamethylenetetramine U.S.P.	*lb.*	.39	
Technical	*lb.*	.33	
Lead oleate, No. 999	*lb.*	.135	
Witco	*lb.*	.15	
Ledate	*lb.*	2.00	
Monex	*lb.*	2.00	
Novex	*lb.*		
O-N-V	*lb.*	1.00	/ 1.10
O-X-A-F	*lb.*	.50	/ .55
Ovac	*lb.*	.50	/ .55
Oxynone	*lb.*	.70	/ .90
Para-nitroso-dimethylaniline	*lb.*	.85	
Pentex	*lb.*	1.00	/ 1.10
Flour	*lb.*	.15	/ .16
Phenex	*lb.*	.50	/ .55
Pip-Pip	*lb.*	2.50	
Pipsolene	*lb.*	1.55	/ 1.85
R-23	*lb.*	.40	
R & H 50-D	*lb.*	.42	/ .43
Rotax	*lb.*	.60	/ .65
Safex	*lb.*	1.20	/ 1.30
Santocure	*lb.*	.80	/ 1.00
Selenac	*lb.*	2.50	
SPDX	*lb.*	.70	/ .75
A	*lb.*	.70	/ .75
Super-sulphur No. 1	*lb.*	.50	
2	*lb.*	.18	/ .20
Tetrone A	*lb.*	2.70	
Thiocarbanilide	*lb.*	.24	/ .30
Thionex	*lb.*	2.35	
Thiurad	*lb.*	2.35	
Trimene	*lb.*	.55	/ .65
Base	*lb.*	1.05	/ 1.20
Triphenylguanidine (TPG)	*lb.*	.45	
Tuads	*lb.*	2.00	
Ulto	*lb.*	1.25	/ 1.75
Ureka	*lb.*	.60	/ .75
Blend B	*lb.*	.60	/ .75
C	*lb.*	.56	/ .65
Vulcanex	*lb.*	.42	/ .43
Vulcanol	*lb.*	.85	
Z-B-X	*lb.*	2.50	
Zenite	*lb.*	.46	/ .48
A	*lb.*	.53	/ .55
B	*lb.*	.46	/ .48
Zimate (Methyl)	*lb.*	2.00	

Activators

Aero Ac 50	*lb.*	.46	/ .56
Barak	*lb.*	.50	
MODX	*lb.*	.30	/ .35
SL No. 10	*lb.*	.12	

Age Resisters

AgeRite Alba	*lb.*	2.00	
Exel	*lb.*	1.00	/ 1.02
Gel	*lb.*	.57	/ .59
Hipar	*lb.*	.65	/ .67
Powder	*lb.*	.52	/ .54
Resin	*lb.*	.52	/ .54
D	*lb.*	.52	/ .54
White	*lb.*	1.25	/ 1.40
Akroflex C	*lb.*	.56	/ .58
Albasan	*lb.*	.70	/ .75
Aminox	*lb.*	.52	/ .61
Antox	*lb.*	.56	
Betanox	*lb.*	$0.52	/$0.61
Special	*lb.*	.65	/ .74
B-L-E	*lb.*	.52	/ .61
Powder	*lb.*	.65	/ .74
B-X-A	*lb.*	.52	/ .61
Copper Inhibitor X-872-A	*lb.*	1.15	
Flectol B	*lb.*	.52	/ .65
H	*lb.*	.52	/ .65
White	*lb.*	.90	/ 1.15
M-U-F	*lb.*	1.50	
Neozone (standard)	*lb.*	.63	
A	*lb.*	.52	/ .54
B	*lb.*	.63	
C	*lb.*	.52	/ .54
D	*lb.*	.52	/ .54
E	*lb.*	.63	
Oxynone	*lb.*	.64	/ .80
Parazone	*lb.*	.68	
Permalux	*lb.*	1.20	
Santoflex B	*lb.*	.52	/ .65
BX	*lb.*	.58	/ .71
Santovar A	*lb.*	1.15	/ 1.40
Solux	*lb.*	1.30	
Stabilite	*lb.*	.52	/ .54
Alba	*lb.*	.70	/ .75
Thermoflex A	*lb.*	.65	/ .67
Tysonite	*lb.*	.16	/ .1675
V-G-B	*lb.*	.52	/ .61

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing all known ingredients. Requests for information not recorded will receive prompt attention.

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70	/ 3.55
liquid, 50%	100 *lbs.*	1.95	
solid (700-*lb. drums*)	100 *lbs.*	2.30	/ 3.15

Antiscorch Materials

A-F-B	*lb.*	.35	/ .40
Antiscorch T	*lb.*	.90	
Cumar RH	*lb.*	.10	
E-S-E-N	*lb.*	.35	/ .40
R-17 Resin (*drums*)	*lb.*	.10	
RM	*lb.*	1.25	
Retarder W	*lb.*	.36	
Retardex	*lb.*	.45	/ .48
U-T-B	*lb.*	.35	/ .40

Antiseptics

Compound G-4	*lb.*		
G-11	*lb.*		

Antisun Materials

Heliozone	*lb.*	.22	/ .23
S.C.R.	*lb.*	.33	/ .35
Sunproof	*lb.*	.22	/ .27

Brake Lining Saturant

B.R.T No. 3	*lb.*	.0165/	.0175

Colors

Black

Du Pont powder	*lb.*	.42	/ .44
Lampblack (commercial), *l.c.l.*	*lb.*	.15	

Blue

Du Pont dispersed	*lb.*	.83	/ 3.95
Powders	*lb.*	2.25	/ 3.75
Toners	*lb.*	.08	/ 3.85

Brown

Mapico	*lb.*	.11	

Green

Chrome, light	*lb.*		
medium	*lb.*	.22	
oxide (*freight allowed*)	*lb.*		
Du Pont Dispersed	*lb.*	.98	/ 1.75
Powders	*lb.*	1.00	/ 5.50
Guignet's (*bbls.*)	*lb.*	.70	
Toners	*lb.*	.85	/ 3.75

Orange

Du Pont Dispersed	*lb.*	.88	/ .98
Powders	*lb.*	.88	/ 2.75
Toners	*lb.*	.40	/ 1.60

Orchid

Toners	*lb.*	1.50	/ 2.00

Pink

Toners	*lb.*	1.50	/ 2.00

Purple

Toners	*lb.*	.60	/ 2.10

Red

Antimony			
Crimson, 15/17%	*lb.*		
R. M. P. No. 3	*lb.*	.48	
Sulphur free	*lb.*		
R.M.P.	*lb.*	.52	
Golden 15/17%	*lb.*		
7-A	*lb.*	.37	
Z-2	*lb.*	.23	
Cadmium, light (400-*lb. bbls.*	*lb.*	.75	/ .80
Du Pont dispersed	*lb.*	.93	/ 2.05
Powders	*lb.*	.285	/ .90
Mapico	*lb.*	.0925	
Rub-Er-Red (*bbls.*)	*lb.*	.0925	
Toners	*lb.*	.08	/ 2.00

White

Lithopone (*bags*)	*lb.*	.0385/	.0410
Albalith	*lb.*	.0385/	.0410
Astrolith (50-*lb. bags*)	*lb.*	.0385/	.0410
Azolith	*lb.*	.0385/	.0410

Titanium Pigments
- Raycal lb. $0.0525/$0.055
- Rayox lb. .135 / .1425
- Titanolith (50-*lb. bags*) lb. .0525/ .055
- Titanox-A lb. .135 / .165
- B lb. .055 / .065
- 30 lb. .055 / .065
- C lb. .0525/ .0625
- M lb. .055 / .065
- Ti-Tone lb.
- Zopaque (50-*lb. bags*) lb. .135 / .1425

Zinc Oxide
- Azo ZZZ-11 lb. .065 / .0675
- 44 lb. .065 / .0675
- 55 lb. .065 / .0675
- 66 lb. .075 / .0775
- French Process, Florence
- Green Seal-8 lb. .0825/ .0850
- Red Seal-9 lb. .0775/ .08
- White Seal-7 lb. .0875/ .09
- Kadox, Black Label-15 lb. .065 / .0675
- No. 25 lb. .0775/ .08
- Red Label-17 lb. .065 / .0675
- Horse Head Special 3 lb. .065 / .0675
- XX Red-4 lb. .065 / .0675
- 23 lb. .065 / .0675
- 72 lb. .065 / .0675
- 78 lb. .065 / .0675
- 80 lb. .065 / .0675
- 103 lb. .065 / .0675
- 110 lb. .065 / .0675
- St. Joe (lead free)
- Black Label lb. .065 / .0675
- Green Label lb. .065 / .0675
- Red Label lb. .065 / .0675
- U.S.P. lb. .0975/ .10

Zinc Sulphide Pigments
- Cryptone-BA-19 lb. .0525/ .055
- BT lb. .0525/ .055
- CB lb. .0525/ .055
- MS lb. .055 / .0575
- ZS No. 20 lb. .0775/ .08
- 86 lb. .0775/ .08
- 230 lb. .0775/ .08
- 800 lb.
- Sunolith lb. .0385/ .0410

Yellow
- Cadmolith (cadmium yellow), (400-*lb. bbls.*) lb. .50 / .55
- Du Pont dispersed lb. 1.25 / 1.75
- Powders lb. .135 / 2.75
- Mapico lb. .0675
- Toners lb. 2.50

Dispersing Agents
- Bardex lb. .0395/ .042
- Bardol lb. .0225/ .025
- Darvan No. 1 lb. .30 / .34
- No. 2 lb. .30 / .34
- Nevoll (*drums, c.l.*) lb. .0225
- Santomerse S lb. .11 / .25

Fillers, Inert
- Asbestine, *c.l.* ton 15.00
- Barytes ton 30.00 /36.00
- f.o.b., St. Louis (50-*lb. paper bags*) ton 22.85
- off color, domestic ton 21.50 /26.50
- white, imported ton
- Blanc fixe, dry, precip. lb. .03 / .035
- Calcene ton 37.50 /43.00
- Infusorial earth lb. .025 / .03
- Kalite No. 1 ton 24.00 /30.00
- 3 ton 34.00 /40.00
- Kalvan ton 95.00
- Magnesia, calcined, heavy lb.
- Carbonate, *l.c.l.* lb. .0725/ .095
- Paradene No. 2 (*drums*) lb. .045
- Pyrax A ton 6.50
- Vinsol Resin lb.
- Whiting
- Columbia Filler ton 9.00 /14.00
- Suprex, white extra light ton 45.00
- heavy ton 45.00
- Witco, *c.l.* ton 6.00

Finishes
- Black-Out (surface protective) gal. 4.00 / 5.00
- Rubber lacquer, clear gal. 1.00 / 2.00
- colored gal. 2.00 / 3.50
- Starch, corn, pwd. 100 lbs.
- potato lb.
- Shoe Varnish gal. 1.45
- Talc ton .025 / .035

Flock
- Cotton flock, dark lb. .09 / .12
- dyed lb. .40 / .80
- white lb. .11 / .20
- Rayon flock, colored lb. 1.00 / 2.00
- white lb. .90 / 1.00

Latex Compounding Ingredients
- Accelerator 85 lb. .35
- 89 lb. 1.40
- 122 lb. 1.55
- 552 lb. 2.50
- Aerosol OT Aqueous 10% lb. .15 / .175
- Antox, dispersed lb. .42
- Aquarex A lb. .35
- D lb. .75
- F lb. .85
- WA Paste lb. .28
- Areskap No. 50 lb. .18 / .24
- 100, dry lb. .39 / .51
- Aresket No. 240 lb. $0.16 /$0.22
- 300, dry lb. .42 / .50
- Aresklene No. 375 lb. .35 / .50
- 400, dry lb. .51 / .65
- Black No. 25, dispersed lb. .22 / .40
- Collocarb lb. .07
- Color Pastes, dispersed lb. .38 / 1.90
- Dispersex No. 15 lb. .11 / .12
- No. 20 lb. .08 / .10
- Emo, brown lb. .15
- white lb. .15
- Factice Compound, dispersed lb. .36
- Factex Dispersion A lb. .16
- Heliozone, dispersed lb. .25
- Igepon A lb.
- Latac lb
- MICRONEX, Colloidal lb. .055 / .07
- Nekal BX (dry) lb.
- Pipsol X lb. 3.05 / 3.55
- R-2 Crystals lb. 2.50 / 2.75
- RN-2 Crystals lb. 2.00 / 2.25
- S-1 (400 *lb. drums*) lb. .65
- Santobrite Briquettes lb. .17 / .26
- Powder lb. .16 / .26
- Santomerse D lb. .41 / .65
- S lb. .11 / .25
- No. 1 lb. .18 / .35
- No. 2 lb. .18 / .35
- No. 3 lb. .40 / .65
- No. 3P lb. .29 / .45
- Stablex A lb. .90 / 1.10
- B lb. .65 / .90
- C lb. .40 / .50
- Sulphur, dispersed lb. .10 / .15
- No. 2 lb. .075 / .12
- T-1 (440-*lb. drums*) lb. .40
- Tepidone lb. 1.20
- Vulcan Colors lb.
- Zinc oxide, dispersed lb. .12 / .15

Mineral Rubber
- Black Diamond ton 25.00
- B.R.C. No. 20 lb. .009 / .01
- Hydrocarbon, hard ton 23.00 /27.00
- Genasco Hydrocarbon, granulated ton
- solid ton
- Gilsonite ton
- Parmr ton 23.00 /27.00
- Pioneer ton
- 285°-300° ton 23.00 /42.00

Mold Lubricants
- Aluminum Stearate lb. .18 / .19
- Lubrex lb. .25 / .30
- Mold Paste lb. .12 / .18
- Sericite ton 65.00 /75.00
- Soapbark lb.
- Soapstone, *l.c.l.* ton 25.00 /35.00

Oil Resistant
- AXF lb. .40 / .50

Reclaiming Oils
- B.R.V. lb. .032 / .0345
- No. 1621 lb. .019 / .02
- S.R.O. lb. .019 / .02
- X-159 gal. .20
- Rox No. 1 lb. .0225/ .025

Reenforcers
- Carbon Black
- Aerfloted Arrow Specification (*bags only*) lb. .02925†
- Arrow Compact Granulized lb. .02925†
- Certified Heavy Compressed (*bags only*) lb. .02925†
- Spheron lb. .02925†
- Continental, dustless lb. .02925†
- Compressed (*bags only*) lb. .02925†
- Disperso lb. .02925†
- Dixie lb. .02925†
- Dixiedensed lb. .02925†
- 66 lb. .02925†
- Excello, dustless lb. .02925†
- Fumonex lb. .03
- ex. warehouses lb. .05
- Gastex lb. .03 / .07
- Kosmobile lb. .02925†
- 66 lb. .02925†
- Kosmos lb. .02925†
- MICRONEX Beads lb. .02925†
- Mark II lb. .02925†
- Standard lb. .02925†
- W-5 lb. .02925†
- W-6 lb. .02925†
- P-33 lb. .0475 / .0775
- Pelletex lb. .03 / .07
- Supreme, dustless lb. .02925†
- Thermax lb. .02 / .0525
- Velvetex lb. .029 / .034
- "WYEX BLACK" lb. .02925†
- Carbonex Flakes lb. .029 / .034
- S lb. .03 / .0350
- Clays
- Aerfloted Paragon (50-*lb. bags*) ton 10.00
- Suprex (50-*lb. bags*) ton 10.00
- Barden ton 10.00
- Catalpo, *c.l.* ton 30.00
- Chicora ton $10.00
- China ton 22.50
- Crown ton 10.00
- Dixie ton 10.00 /$22.50
- Hi-White ton 10.00
- Langford ton 7.50
- McNamee ton 10.00 /22.50
- Par ton 10.00
- Paraforce, *c.l.* ton 60.00
- Witco, *c.l.* ton 10.00
- Cumar EX lb. .045
- MH lb. .06 / .11
- V lb. .09 / .12
- Silene lb. .04 / .045

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is 2.75¢ per pound; f.o.b. Hoboken (bulk), 3.63¢; f.o.b. No. Atlantic Docks (bags), 3.80¢. All prices are carlot.

Reodorants
- Amora A lb.
- B lb.
- C lb.
- D lb.
- Curodex 19 lb. 2.75
- 188 lb. 3.50
- 198 lb.
- Para-Dors lb.
- Rodo No. 0 lb. 3.50 / 4.00
- 10 lb. 4.50 / 5.00

Rubber Substitutes
- Black lb. .08 / .12
- Brown lb. .08 / .115
- White lb. .085 / .135
- Factice
- Amberex lb. .25
- Type B lb. .1875
- Brown lb. .075 / .115
- Fac-Cel B lb. .1325
- C lb. .1325
- Neophax A lb. .09
- B lb. .09
- White lb. .09 / .135

Softeners
- B.R.T. No. 7 lb. .0165/ .0175
- Bondogen lb. .98 / 1.05
- Burgundy pitch lb. .06
- Cycline oil gal. .14 / .20
- Dispersing Oil No. 10 lb. .0335/ .036
- Nuba resinous pitch (*drums*)
- Grades No. 1 and No. 2 lb. .0265
- 3-X lb. .04
- Nypene Resin lb. .016 / .0165
- Palm oil (Witco), *c.l.* lb.
- Palmol lb. .125
- Para Flux gal. .17 / .18
- No. 2016 gal. .19 / .20
- Para Lube lb. .0425/ .048
- Pine tar gal.
- Plastogen lb. .0775/ .08
- Plastone lb. .27 / .30
- R-19 Resin (*drums*) lb. .10
- 21 Resin (*drums*) lb. .10
- Reogen lb. .12 / .18
- Rosin oil, compounded gal. .40
- RPA No. 1 lb. .65
- 2 lb. .65
- 3 lb. .46
- Rubtack lb. .10
- Tackol lb. .083 / .18
- Tonox lb. .52 / .61
- Tonox D lb. .75 / .85
- Witco No. 20, *l.c.l.* gal. .20
- X-1 resinous oil (*tank car*) lb. .01

Softeners for Hard Rubber Compounding
- Resin C. Pitch 45°C. M.P. lb. .013 / .014
- 60°C. M.P. lb. .013 / .014
- 75°C. M.P. lb. .013 / .014

Solvents
- Beta-Trichlorethane gal.
- Carbon bisulphide lb.
- tetrachloride lb.
- Cosol No. 1 gal. .25 / .30
- No. 2 gal. .20 / .28
- No. 3 gal. .20 / .28
- Industrial 90% benzol (*tank car*) gal. .14
- Skellysolve gal.

Stabilizers for Cure
- Calcium Stearate lb. .205 / .225
- Laurex (*bags*) lb. .1025/ .1275
- Stearex B lb. .095 / .105
- Beads lb. .09 / .10
- Stearic acid, single pressed lb. .095 / .105
- Stearite, *c.l.* lb. .09
- Zinc stearate lb. .23 / .25

Synthetic Rubber
- Neoprene Type E lb. .65
- G lb. .70
- GW lb. .75
- M lb. .65
- Latex Type 56 lb. .30
- Synthetic 190 lb. .53

Tackifier
- B.R.H. No. 2 lb. .017 / .02
- Staybelite lb.

Vulcanizing Ingredients
- Sulphur 100 lbs. 2.00
- Chloride (*drums*) lb. .035 / .04
- Telloy lb. 1.75
- Vandex lb. 1.75
- (See also Colors—Antimony)

(*Continued on page 96*)

COTTON AND FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	Nov. 30	Dec. 28	Jan. 4	Jan. 11	Jan. 18	Jan. 25
Jan.	9.96	10.18	10.29	10.46	.....	.....
Feb.	.....	.....	10.34	10.50	10.30	10.35
Mar.	10.07	10.29	10.40	10.54	10.36	10.40
July	9.76	10.03	10.17	10.47	10.31	10.34
Sept.	9.42	9.66	9.78	10.12	10.03	10.03
Dec.	.....	.....	9.56	9.92	9.83	9.83

New York Quotations

January 27, 1941

Drills

38-inch 2.00-yard ... yd.	$0.14¼
40-inch 3.47-yard	.08½
50-inch 1.52-yard	.19¾
52-inch 1.85-yard	.16⅜
52-inch 1.90-yard	.15⅞/.16
52-inch 2.20-yard	.14¾
52-inch 2.50-yard	.13
59-inch 1.85-yard	.16½

Ducks

38-inch 2.00-yard D. F. ... yd	.14¼/.14½
40-inch 1.45-yard S. F.	.19¾
51½-inch 1.35-yard D. F.	.20¾
72-inch 1.05-yard D. F	.29½/.30¾
72-inch 17.21-ounce	.34⅞
Mechanicals	
Hose and belting ... lb.	.30
Tennis	
52-inch 1.35-yard ... yd.	.22½

Hollands

Gold Seal and Eagle	
20-inch No. 72 ... yd	.10¾
30-inch No. 72	.19½
40-inch No. 72	.21½
50-inch No. 72	.29½
Red Seal and Cardinal	
20-inch ... yd.	.09¼
30-inch	.17¼
40-inch	.18½
50-inch	.27½

Osnaburgs

40-inch 2.34-yard ... yd.	.11⅞
40-inch 2.48-yard	.11⅛
40-inch 2.56-yard	.09¾
40-inch 3.00-yard	.09¼
40-inch 7-ounce part waste	.09⅝
40-inch 10-ounce part waste	.13½
37-inch 2.42-yard	.11½

Raincoat Fabrics

Cotton	
Bombazine 60 x 64 ... yd.	.08¾
Plaids 60 x 48	.12¼
Surface prints 60 x 64	.13½
Print cloth, 38½-inch, 60 x 64.	.05⅝
Sheetings, 40-inch	
48 x 48, 2.50-yard ... yd.	.08¼
64 x 68, 3.15-yard	.09
56 x 60, 3.60-yard	.08
44 x 40, 4.25-yard	.06⅜
Sheetings, 36-inch	
48 x 48, 5.00-yard ... yd.	.05⅜
44 x 40, 6.15-yard	.04⅜

Tire Fabrics

Builder	
17¼ ounce 60" 23/11 ply Karded peeler ... lb.	.29½
Chafer	
14 ounce 60" 20/8 ply Karded peeler ... lb.	.29
9¼ ounce 60" 10/2 ply Karded peeler ... lb.	.28½
Cord Fabrics	
23/5/3 Karded peeler, 1 1/16" cotton ... lb.	.30
15/3/3 Karded peeler, 1 1/16" cotton ... lb.	.28
12/4/2 Karded peeler, 1 1/16" cotton ... lb.	.27
23/5/3 Karded peeler, 1¼" cotton ... lb.	.35½
23/5/3 Combed Egyptian ... lb.	.49
Leno Breaker	
8¼ ounce and 10¼ ounce 60" Karded peeler ... lb.	.31½

COTTON prices ruled firm during the past month, with "inflationary" interpretations of the President's budget and news of an added cut in the cotton acreage as strengthening factors. The New York 15/16-inch spot middling price, which closed at 10.60¢ per pound on December 30, moved within relatively narrow limits throughout January to close at the somewhat higher level of 10.85¢ per pound on January 23. Thereafter the market was steady, and the closing price on January 28 was 10.88¢.

If the preliminary allotments of 26,699,917 acres for 1941, as announced by the Department of Agriculture on January 2, results in the planting of about 25,000,000 acres, as they did in 1939 and 1940, a cotton production of approximately 12,500,000 bales would be expected under conditions of normal yield. A supplementary program for voluntary reduction of cotton acreage below the 1941 national allotment and for expected increased consumption of cotton goods was announced by the Department of Agriculture on January 12. Under the program farmers will receive cotton stamps for their voluntary reduction in planting, which are to be used for purchasing cotton goods. It is estimated that the latter program might result in a reduction of supplies for the year of about 1,000,000 bales.

According to the Bureau of Census, 775,472 bales of cotton were consumed by domestic mills during December, a new high for that month and second on record only to the 777,000 bales in March, 1937. Consumption for the first five months of the current season totaled 3,584,017 bales, a new high record for all time, which compares with 3,310,000 bales in the same period last season. December exports of cotton totaled 107,375 bales, against 144,710 in November and 806,720 in December, 1939. For five months of this season exports were 691,019 bales, against 3,134,415 a year ago. Thus, while domestic consumption is scoring new highs, exports have been slashed so that they amount to only about one-fifth of a year ago.

The Census Bureau reported that 11,931,018 running bales of cotton had been ginned from the 1940-41 crop to January 16.

The British Ministry of Economic Warfare indicated that Russian imports from the United States, particularly cotton, were indirectly aiding Germany. British figures were cited which showed that between October 15 and December 15, 1940, Russia imported more cotton from the United States than is ordinarily imported from all sources during a full year. During 1940 Russia exported to Germany 100,000 tons of cotton.

Fabrics

The demand for fabrics was extremely active during January, with sales volume considerably ahead of production for the greater part of the month. The demand reflected both consumer and government interest. There continues to be a scarcity of cloth for nearby delivery, particularly in respect to special constructions. The mechanical rubber goods trade was reported to have shown active interest in sheetings for third-quarter delivery, after buying in volume for second-quarter delivery. Raincoat manufacturers were reported to be rather quiet, with interest centered on presenting their spring lines.

The market continues strong with practically all types of constructions in the following fabric groups showing relatively sharp price advances: drills, ducks, osnaburgs, raincoat fabrics, and sheetings. Hollands and tire fabrics are steady and unchanged. With deliveries becoming increasingly tight, a continuance of the present price tendency is anticipated.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1938	26,606,048	$ 4,147,318
1939	61,460,003	10,467,552
1940		
Jan.	7,639,568	1,412,728
Feb.	4,862,684	947,524
Mar.	7,561,780	1,473,056
Apr.	8,430,063	1,608,156
May	8,029,276	1,523,879
June	5,490,018	1,004,007
July	5,109,739	993,411
Aug.	5,102,983	1,022,531
Sept.	6,614,718	1,337,487
Oct.	2,590,088	512,153
Nov.	5,969,192	1,169,086

Data from Leather and Rubber Division, Washington, D. C.

New York Outside Market Rubber Quotations

Latex	Jan. 26, 1940	Dec. 30, 1940	Jan. 28, 1941
Normal, 38-40%, gal.	$0.73/0.75	$0.78/0.79	$0.75/0.76
Centrifuged, 60-63% ... gal.	.. ..	1.34/1.35	1.30/1.31
Paras			
Upriver fine ... lb.	.19¼	.16½	.16½
Upriver fine ... lb.	*.23¼	*.19¾	*.19¼
Upriver coarse. lb.	.11¼	.11½	.11
Upriver coarse. lb.	*.19	*.16⅞	*.17
Islands fine ... lb.	.18¾	.16	.16½
Islands fine ... lb.	*.23	*.19¼	*.19
Acre, Bolivian fine ... lb.	.19½	.16¾	.16¾
Acre, Bolivian fine ... lb.	*.23½	*.19⅞	*.19½
Beni, Bolivian fine ... lb.	.20	.18	.17¾
Madeira fine ... lb.	.19¼	.16½	.16½
Caucho			
Upper ball ... lb.	.11¼	.11½	.11
Upper ball ... lb.	*.19	*.16¾	*.17
Lower ball ... lb.	.11	.10½	.10½
Pontianak			
Pressed block .. lb.	.12¾/.17½	.16/.25	.15/.27
Guayule			
Ampar ... lb.	.15	.15½	.15½
Africans			
Rio Nuñez .. lb.	.19	.18½	.18½
Black Kassai ... lb.	.19	.19	.19
Prime Niger flake ... lb.	.22	.22½	.22½
Gutta Percha			
Gutta Siak ... lb.	.17	16½/.17½	.16½/.17½
Gutta Soh ... lb.	.24	.27	.26
Red Macassar .. lb.	1.20	1.20	1.20
Balata			
Block Ciudad Bolivar ... lb.	.35	.42	.42
Manaos block .. lb.	.40	.45	.45
Surinam sheets. lb.	.45	.54	.54
Amber ... lb.	.50	.56	.56

* Washed and dried crepe. Shipments from Brazil.

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption¶	U.S. Stocks Mfrs., Dealers, Importers, Etc.†¶	U.S. Stocks Afloat	U.K.—Public Warehouses, London, Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Production (Net Exports)‡	World Consumption Estimated‡	World Stocks†‡§
1938	400,178	437,031	231,500	45,105	86,853	27,084	894,900	942,252	596,498
1939	499,616	592,000	125,800	91,095	44,917*a*	15,299	1,004,429	1,110,358	447,666*a*
1940									
Jan	72,520	54,978	142,368*b*	90,285 *b*	......	35,928	108,883	106,073	....
Feb.	43,088	49,832	134,328*b*	112,257 *b*	......	33,563	113,863	96,755	....
Mar.	59,277	50,192	142,414*b*	113,619 *b*	......	23,830	112,221	102,282	....
Apr.	70,699	50,103	162,459*b*	102,557 *b*	......	42,239	88,326	100,570	....
May	51,431	51,619	161,446*b*	109,364 *b*	......	32,731	123,047	94,988	....
June	53,889	46,506	168,235*b*	119,138 *b*	......	32,375	110,348	78,642	....
July	69,596	47,011	190,222*b*	139,629 *b*	......	36,716	127,215	75,607	....
Aug.	73,028	50,234	213,002*b*	141,286 *b*	......	40,395	120,729	80,011	....
Sept.	78,973	50,206	241,358*b*	137,033 *b*	......	29,069	133,715	77,978	....
Oct.	74,716	56,477	259,140*b*	166,837 *b*	......	33,638	126,228	87,177	....
Nov.	72,901	54,652	276,943*b*	158,095 *b*	......	33,778	99,649	84,352	....
Dec.	97,984	56,539	318,486*b*	145,950 *b*	......	......	......	......	....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡*Statistical Bulletin of the International Rubber Regulation Committee.* §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a.* Stocks as of Aug. 31, 1939. *b.* Includes government emergency rubber.

THE Rubber Manufacturers Association, Inc., estimated that United States rubber manufacturers consumed 56,539 long tons of crude rubber during December, increase of 3.5% above November and 13.9% above December, 1939. Consumption for 1940, 618,349 long tons, represents a new high for the industry.

Gross imports for December, as reported by the Department of Commerce, also were the highest on record, 97,984 long tons, 34.4% over November and 37.1% over December, 1939.

Total domestic stocks are estimated by the Association as of December 31, 1940, to be 318,486 long tons, 15% over stocks on hand November 30 and 153.2% over the stocks on hand December 31, 1939.

Stocks held by U. S. Government on December 31, 1940, were 112,811 long tons, 31.7% over November 30 stocks.

Crude rubber afloat to U. S. ports December 31 is estimated at 145,950 long tons, 7.7% under November, but 60.2% above December, 1939.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production†	Consumption†	Consumption % of Crude	U.S. Stocks*†	Exports
1938	122,403	120,800	27.6	23,000	7,403
1939	186,000	170,000	28.7	25,250	12,611
1940	209,601	187,090	30.3	34,701	....
1940					
Jan.	19,297	16,070	29.2	27,418	1,059
Feb.	17,992	15,370	30.8	28,602	1,436
Mar.	17,234	15,931	31.7	28,488	1,420
Apr.	16,568	16,298	32.5	27,558	977
May	17,552	15,719	30.5	28,397	866
June	16,631	14,912	32.1	29,260	1,207
July	14,342	14,298	30.4	28,058	1,232
Aug.	17,213	14,224	28.3	29,786	1,300
Sept.	16,428	14,589	29.1	30,287	1,031
Oct.	19,358	16,528	29.3	32,118	716
Nov.	17,689	16,042	29.4	33,143	681
Dec.	19,297	17,109	30.2	34,701	....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimates of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, December reclaimed rubber consumption is estimated at 17,109 long tons, 6.6% above that of November; production at 19,297 long tons; and stocks on hand December 31, at 34,701 long tons. December consumption was the highest since November, 1939. Total consumption of reclaim during 1940 was 187,090 long tons, the largest yearly total since 1929. Consumption of reclaim during January continued at a high level with all consuming divisions reported active and, it is believed, may exceed that of the previous month.

The market is steady, and no change has occurred in the price structure since the advance on tubes last month.

New York Quotations

January 23, 1941

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
Red Tube	1.15-1.30	9½/ 9¾
Compound	1.10-1.20	9 /10¼
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	12½/14

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

RUBBER SCRAP

THE demand for scrap rubber during January continued active with reclaim production at a high level. Export business was reported quiet. Department of Commerce figures show that Japan again took the bulk of our scrap rubber exports during November, 7,030,054 pounds out of a total of 10,608,510 pounds exported. Japanese imports of scrap have increased from 2,214 long tons in 1936 to 4,840 in 1937, 5,322 in 1938, and 21,703 in 1939. Over 90% of these imports came from the United States. The amount of scrap collected in Japan is believed to be less than 5,000 tons a year. Japanese reclaiming has been enlarged from between 5,000 and 10,000 long tons capacity in 1936 to between 25,000 and 30,000 tons for 1940. There are 18 firms reclaiming by the alkali process; while the Japan Oil Reclaimed Rubber Association has 115 members, believed to be small firms.

The market continued firm with price advances registered on the following grades: No. 2 compound, red, and mixed tubes; beadless mixed auto tires; mixed solid truck tires; and No. 1 red mechanicals. No other changes occurred.

Consumers' Buying Prices

(Carlot Lots for January 23, 1941)

		Prices
Boots and Shoes		
Boots and shoes, black	*lb.*	$0.01¼ $0.01⅜
Colored	*lb.*	.00⅞/ .01
Untrimmed arctics	*lb.*	.00⅞/ .01
Inner Tubes		
No. 1, floating	*lb.*	.11 / .12
No. 2, compound	*lb.*	.05⅛/ .05⅜
Red	*lb.*	.04⅞/ .05
Mixed tubes	*lb.*	.04⅜/ .04½
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	*ton*	15.00 /15.50
Beadless	*ton*	19.00 /19.50
Auto tire carcass	*ton*	45.00 /47.00
Black auto peelings	*ton*	46.00 /48.00
Solid		
Clean mixed truck	*ton*	34.00 /36.00
Light gravity	*ton*	42.00 /44.00
Mechanicals		
Mixed black scrap	*ton*	33.00 /34.00
Hose, air brake	*ton*	22.00 /24.00
Garden, rubber covered	*ton*	12.00 /14.00
Steam and water, soft	*ton*	12.00 /14.00
No. 1 red	*lb.*	.03¼/ .03½
No. 2 red	*lb.*	.02½/ .02¾
White druggists' sundries	*lb.*	.03¾/ .04
Mixed mechanicals	*lb.*	.02¼/ .02½
White mechanicals	*lb.*	.03¾/ .04
Hard Rubber		
No. 1 hard rubber	*lb.*	.11½/ .13

THE UNITED STATES WITH 3,065,000 miles of highways has a road mileage nearly three times as great as the total of England, France, Spain, Portugal, Germany, and Italy combined. *American Petroleum Institute.*

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

RUBBER CHEMIST, ELEVEN YEARS' EXPERIENCE WITH large and small companies in compounding and processing rubber goods and all synthetics here and abroad. Good experience with latex, airfoam sponge, cushions, and dipped goods. Available on short notice. Location immaterial, also South America. Excellent references. Practical man. 37 years old. Address Box No. 208, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, EMPLOYED IN MIDWEST, 3 YEARS' EXperience in research and compounding of natural rubber and synthetics as assistant to chief chemist. Knowledge of factory processes. Can organize and direct plant laboratory. Consider responsible position only. Location secondary. Address Box No. 209, care of INDIA RUBBER WORLD.

FOREMAN, COMPOUNDING, TEST ROOM, CONTROL ROOM, very exact, very quick, 15 years' experience, Mechanical Seamless Spreading, accept position. Address Box No. 210, care of INDIA RUBBER WORLD.

PLANT ENGINEER—20 YEARS DESIGN, CONSTRUCTION, OPERation, all types rubber products. Location immaterial. Address Box No. 211, care of INDIA RUBBER WORLD.

CHEMIST, TWENTY-TWO YEARS' VARIED EXPERIENCE, INcluding reclaiming and preparation and evaluation of mineral fillers. Address Box No. 213, care of INDIA RUBBER WORLD.

SUPERINTENDENT WITH 16 YEARS' PRACTICAL EXPERIENCE all phases mechanical rubber manufacture and procedure, desires better connection, would also consider selling. Location immaterial. Presently with small Midwestern rubber manufacturing company. Available short notice. Address Box No. 215, care of INDIA RUBBER WORLD.

SITUATIONS WANTED *(Continued)*

SUPERINTENDENT AND DEVELOPMENT ENGINEER DESIRES change. Eighteen years' experience in the manufacture of mechanicals, synthetic and sponge rubber goods. Well educated. Capable compounder. Address Box No. 216, care of INDIA RUBBER WORLD.

LATEX CHEMIST: AGE 30, TEN YEARS' EXPERIENCE IN developing and compounding of latex. Thorough knowledge of gums and adhesives. Now employed, excellent references, desires change. Address Box No. 217, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

TRENTON PLANT PREPARED TO DO CUSTOM MILLING, expert compounding and process work for all requirements. Address Box No. 212, care of INDIA RUBBER WORLD.

WANTED: RUBBER FACTORY TO BUY OR RENT. Must be equipped with good machinery, also water, electricity, steam, and railroad facilities. State location, inventory, worth of machinery, total price, terms, etc., in letter to Box No. 218, care of INDIA RUBBER WORLD.

(Advertisements continued on page 97)

PATENTS

(*Continued from page* 84)

Vehicle Wheels. D. S. Kennedy and E. A. Dennison.
529,471. **Method and Apparatus for Testing the Deflection of Tires for Vehicles.** Dunlop Rubber Co., Ltd., and R. F. Daw.
529,472 and 529,473. **Method and Apparatus for Measuring or Testing the Flattening or Deflection under Load of Tires for Vehicles.** Dunlop Rubber Co., Ltd., R. F. Daw, and J. H. Mason.
529,474. **Decorative Labels or Sheets** of the Transfer Type. International Latex Processes, Ltd.

TRADE MARKS

United States

383,728. **Aero-Form.** Bandeau and brassieres. H. A. Austin Co., Inc., Worcester, Mass.
383,732. **Escort.** Suspenders, garters, and arm bands. H. Hesse, Toronto, Ont., Canada.
383,733. **Aero-Hinge.** Brassieres and corsets. Blair Corset Co., Chicago, Ill.
383,796. **Walker T. Dickerson.** Shoes. Walker T. Dickerson Co., Columbus, O.
383,804. **Maurice.** Foundation garments. Blair Corset Co., Chicago, Ill.
383,809. **Per-Suede.** Foundation garments. I. B. Kleinert Rubber Co., New York, N. Y.
383,854. **Gwyndel.** Footwear. Strawbridge & Clothier, Philadelphia, Pa.
383,908. **Perma-life.** Hose. Firestone Tire & Rubber Co., Akron, O.
383,909. **Chemigum.** Tires, inner tubes, hose, belts. Goodyear Tire & Rubber Co., Akron, O.
383,999. Representation of a three-section arrow, a hexagon containing the letter **"W"** at the feather end, and the word: **"Weatherhead"** dissecting the middle section of the arrow shaft. Hose. Weatherhead Co., Cleveland, O.
384,014. Representation of two concentric triangles containing the words: **"Security Products Company,"** and the word: **"Trade Mark"** below the triangle base. Trusses and corrective garments. J. D. Grey, doing business as Security Products Co., Dallas, Tex.
384,017. **Kormix.** Materials for molding dentures. E. J. McCormick Rubber Co., Inc., Ridgefield Park, N. J.
384,060. **Cryovac.** Food receptacles. Dewey & Almy Chemical Co., Cambridge, Mass.
384,061. **Cry★O★Vac.** Flexible bags for foodstuffs. Dewey & Almy Chemical Co., Cambridge, Mass.
384,072. Representation of wings containing the words: **"Index Tape."** Tape. Van Cleef Bros., Chicago, Ill.
384,170. Representation of an artist's pallette containing the word: **"Rembrandt."** Hosiery and shoes. Gimbel Brothers, Inc., New York, N. Y.
384,175. Representation of the silhouette of an eagle. Girdles and foundation garments. Strouse, Adler Co., New Haven, Conn.
384,287. **Air-O-Pedic.** Footwear. P. C. Wolfer, Wellesley, Mass.
384,292. **Usex.** Non-metallic sheathed electric cable. United States Rubber Co., New York, N. Y.
384,303. **Cordx Jr.** Insulated electric cord. General Electric Co., Schenectady, N. Y.
384,324. Representation of a label containing the words: **"Made Expressly for Marine Exchange, New Orleans, U. S. A.,"** and two concentric circles encircling a sailing vessel, and containing the words: **"Port side Uniform."** Wearing apparel. Marine Exchange, New Orleans, La.
384,352. **Chemigum.** Synthetic rubber. Goodyear Tire & Rubber Co., Akron, O.
384,366. **Duramin.** Antioxidants. B. F. Goodrich Co., New York, N. Y.

Current Quotations

(*Continued from page* 90)

Waxes

Carnauba, No. 3 chalky ..... *lb.*
2 N.C. .... *lb.*
3 N.C. .... *lb.*
1 Yellow .... *lb.*
2 .... *lb.*
Montana, crude .... *lb.*

U. S. Crude and Waste Rubber Imports for 1940

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1940	Totals 1939	Balata	Miscellaneous	Waste
Jan. ....*tons*	**68,856**	**2,768**	406	161	74	255	72,520	37,082	107	648	241
Feb.	40,338	1,458	553	453	30	256	43,088	31,038	75	316	34
Mar.	56,027	2,720	119	49	42	320	59,277	45,724	89	659	26
Apr.	66,688	3,219	374	97	12	309	70,699	32,031	63	581	8
May	47,321	2,883	729	186	24	288	51,431	45,886	150	596	204
June	50,785	2,365	267	146	1	325	53,889	34,363	83	494	20
July	67,077	1,586	494	139	54	246	69,596	37,372	152	345	7
Aug.	70,102	2,038	282	206	73	327	73,028	38,585	52	834	107
Sept.	75,239	2,475	794	..	185	280	78,973	37,689	49	1,038	97
Oct.	72,147	1,044	510	461	190	364	74,716	45,628	73	987	161
Nov.	**69,204**	**1,931**	**610**	**668**	82	406	72,901	42,770	81	554	54
Dec.	94,055	2,182	985	265	105	392	97,984	71,448	218	1,166	114
Total 12 mos., 1940 ......*tons*	777,839	26,669	6,123	2,831	872	3,768	818,102*	....	1,192	8,218	1,073
Total 12 mos., 1939 ......*tons*	465,525	22,703	4,694	3,342	684	2,668	....	499,616	927	7,451	1,606

Revised total 818,147: previous monthly corrections* ***not* *available. Compiled from The Rubber Manufacturers Association, Inc., statistics.*

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—Farrel 24"x24" 12 deck, Hydraulic Press, 15" ram; 12—24"x48" Hydraulic Presses, 14" ram; 7—Triplex Hydraulic Pumps, 18 to 35 GPM, 1500 to 5000 lbs. per sq. inch; also Mills, Calenders, Tubers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: 2—U. S. BUREAU OF STANDARDS DYNAMOMETER Tire Testing Apparatus; 1—Two-Roll Water-Cooled Rubber Mill, 6" & 8" dia. x 9" face; 75-foot Link Belt Conveyer, 36" Wide. Also many other items. STEIN EQUIPMENT CORP., 426 BROOME ST., NEW YORK CITY.

MACHINERY AND SUPPLIES WANTED

TIRE WRAPPING MACHINE IN GOOD CONDITION. Address Box No. 214, care of INDIA RUBBER WORLD.

WANTED FOR USER: 1—NO. 3 or NO. 9 BANBURY MIXER; 3—Mills; 1—Calender; 5—Hydraulic Presses, with pumps and accumulators; 2—Tubers. No dealers. Address Box No. 219, care of INDIA RUBBER WORLD.

Rubber Questionnaire—3rd Quarter, 1940*

	Long Tons			
	Inventory at End of Quarter	Production	Shipments	Consumption
RECLAIMED RUBBER				
Reclaimers solely (5)	7,482	18,309	19,119	......
Manufacturers who also reclaim (17)	5,880	14,261	2,188	15,606
Other manufacturers (123)	9,618	......	......	15,156
Totals	22,980	32,570	21,307	30,762

	Long Tons		
SCRAP RUBBER	Inventory	Consumption	Due on Contracts
Reclaimers solely (5)	33,441	19,598	14,331
Manufacturers who also reclaim (14)	57,355	16,137	14,349
Other manufacturers (14)	207	......	......
Totals	91,003	35,735	28,680

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Accessories		
Passenger car, truck, and bus casings	67,232	$74,133,000
Inner tubes for passenger cars, trucks, and buses	9,683	9,175,000
Farm tractor and implement casings and tubes	1,736	2,276,000
Airplane tires and tubes	179	448,000
Motorcycle casings and tubes	68	119,000
Bicycle tires, including juvenile pneumatics (single tubes, casings and tubes)	786	1,713,000
Solid and cushion tires for highway transportation	93	87,000
All other solid and cushion tires	98	396,000
Tire sundries and repair materials	2,510	3,844,000
Totals	82,385	$92,191,000
OTHER RUBBER PRODUCTS		
Mechanical rubber goods	10,461	$33,541,000
Boots and shoes	3,630	15,380,000
Insulated wire and cable compounds	1,798	†
Druggists' sundries, medical and surgical rubber goods	876	3,015,000
Stationers' rubber goods	551	705,000
Bathing apparel	79	213,000
Miscellaneous rubber sundries	595	2,185,000
Rubber clothing	143	972,000
Automobile fabrics	119	342,000
Other rubberized fabrics	980	3,446,000
Hard rubber goods	795	3,005,000
Heels and soles	2,624	4,587,000
Rubber flooring	315	586,000
Industrial sponge rubber: chemically blown	2,260	1,552,000
Foamed latex		1,299,000
Sporting goods, toys, and novelties	581	1,685,000
Totals	25,807	$72,513,000
Grand totals—all products	108,192	$164,704,000

Inventory of Rubber in the United States and Afloat

	Long Tons	
	Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	95,309	21,505
Importers and dealers	29,807	74,580
Totals	125,116	96,085

*Number of rubber manufacturers that reported data was 193; crude rubber importers and dealers, 50; reclaimers (solely), 5; total daily average number of employes (reporting manufacturers and reclaimers), 139,061.

It is estimated that the reported grand total crude rubber consumption is 73.4%; grand total sales value, 75%; the grand total crude rubber inventory, 51.8%; afloat figures, unavailable; the reclaimed rubber production, 67.9%; reclaimed consumption, 71.4%; and reclaimed inventory, 75.9% of the total of the entire industry.

†Owing to the difficulty of securing representative sales figures this item has been discontinued.

Compiled from R.M.A. statistics.

Trade Lists Available

Copies of the following trade lists may be obtained by American firms from the United States Bureau of Foreign and Domestic Commerce by referring to the titles.

†Automobile parts and accessories manufacturing corporations.
‡Chilean market for sporting goods.
*Electrical supplies and equipment, importers and dealers, Canada.
*Electrical supplies and equipment, importers and dealers, Honduras.
*Electrical supplies and equipment, importers and dealers, Costa Rica.
*Electrical supplies and equipment, importers and dealers, Portugal.
‡Market for sporting goods in Peru. $12.
‡Market for sporting goods in Sao Paulo, Brazil. $18.
*Rubber goods, manufacturers, Colombia.

‡Price 10¢. †Price 30¢. *Price $1.00.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	November, 1940		Eleven Months Ended November, 1940	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Crude rubber, etc. . . . . *lb.*	11,311,687	$2,166,905	97,893,849	$19,717,464
Latex (dry weight) . . . . . . *lb.*	898,147	254,252	3,194,203	919,790
Gutta percha . . . . *lb.*	......	......	10,734	5,136
Rubber, recovered . . . . *lb.*	1,277,500	73,929	14,901,000	777,451
Rubber, powdered, and gutta percha scrap . . . . *lb.*	253,200	4,339	11,808,600	101,705
Balata . . . . *lb.*	8,068	3,880	20,229	9,588
Rubber substitute . . . . *lb.*	36,200	7,273	340,600	91,136
Totals	13,784,802	$2,510,578	128,169,215	$21,622,270
PARTLY MANUFACTURED				
Hard rubber comb blanks . . .	......	$3,973	......	$42,590
Hard rubber, n. o. s. . . . . . *lb.*	3,916	3,929	40,185	37,885
Rubber thread no covered . *lb.*	1,097	904	39,362	35,998
Totals	5,013	$8,806	79,547	$116,473
MANUFACTURED				
Bathing shoes . . . . *prs.*	......	......	29,342	$7,482
Belting	......	$12,640	......	150,957
Hose	......	33,358	......	237,509
Packing	......	6,295	......	88,061
Boots and shoes . . . . *prs.*	656	1,975	7,415	10,234
Canvas shoes with rubber soles . . . . *prs.*	58	67	125,324	35,836
Clothing, including waterproofed	......	2,921	......	42,460
Raincoats . . . . *no.*	1,057	4,813	20,101	89,550
Gloves . . . . *doz. prs.*	635	2,842	7,115	24,646
Hot water bottles	......	......	......	9,539
Liquid rubber compound	......	4,453	......	153,920
Tires, bicycle . . . . *no.*	3,305	1,790	40,308	23,014
Pneumatic . . . . *no.*	18,120	1,022,034	126,882	5,543,241
Solid for automobiles and motor trucks . . . . *no.*	2	185	266	10,206
Other solid tires	......	2,619	......	15,472
Inner tubes . . . . *no.*	17,671	185,206	116,773	801,561
Bicycle . . . . *no.*	7,790	1,398	30,982	6,211
Mats and matting	......	11,405	......	77,915
Cement	......	9,792	......	119,122
Golf balls . . . . *doz. prs.*	378	494	33,822	65,707
Heels . . . . *prs.*	6,730	458	76,262	6,653
Other rubber manufactures . .	......	181,164	......	1,784,682
Totals	......	$1,485,909	......	$9,301,978
Totals, rubber imports . .	......	$4,005,293	......	$31,040,721

Exports of Domestic and Foreign Rubber Goods

UNMANUFACTURED	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Waste rubber	$16,708	......	$151,933	......
MANUFACTURED				
Belting	$27,088	......	461,481	......
Bathing caps	......	......	153	......
Canvas shoes with rubber soles	30,908	......	490,810	......
Boots and shoes	231,256	......	3,867,583	......
Clothing, including waterproofed	27,244	......	275,284	......
Heels	1,028	......	108,945	......
Hose	142,502	......	922,460	......
Soles	181	......	120,739	......
Soling slabs	222	......	27,128	......
Tires, pneumatic	346,051	......	4,709,097	......
Not otherwise provided for	......	......	56	......
Inner tubes	36,478	......	444,389	......
Other rubber manufactures . .	113,846	......	601,055	......
Totals	$956,804	......	$12,029,180	......
Totals, rubber exports . . .	973,512	......	$12,181,113	......

Imports by Customs Districts

	November, 1940 *Crude Rubber		November, 1939 *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	18,285,973	$3,300,191	7,739,847	$1,376,308
New York	87,934,362	15,139,712	71,468,743	11,851,805
Philadelphia	5,887,728	931,903	1,096,424	173,325
Maryland	31,606,886	5,542,681	503,917	77,896
Mobile	540,816	95,404	......	......
New Orleans	5,406,985	863,397	593,140	95,230
Galveston	22,500	3,774	......	......
Laredo	47,000	3,686	......	......
El Paso	99,500	8,630	56,000	5,499
Los Angeles	11,655,725	1,973,577	12,124,626	1,929,572
San Francisco	747,921	129,980	438,955	70,711
Oregon	500	36	150,080	22,695
Ohio	949,750	153,848	1,433,655	216,557
Colorado	112,000	17,990	......	......
Tennessee	......	......	56,000	9,898
Totals	163,297,646	$28,164,809	95,661,387	$15,829,496

*Crude rubber including latex dry rubber content.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	October, 1940		Ten Months Ended October, 1940	
	Quantity	Value	Quantity	Value
UNMANUFACTURED—*Free*				
Liquid latex (solids) ..... *lb.*	2,590,088	$512,153	61,802,058	$11,884,423
Jelutong or pontianak .... *lb.*	2,595,066	382,168	13,225,125	1,954,964
Balata .... *lb.*	157,394	38,092	1,180,400	217,090
Gutta percha .... *lb.*	421,151	90,202	4,015,229	725,325
Guayule .... *lb.*	854,300	77,286	6,637,421	616,834
Scrap and reclaimed ...... *lb.*	370,153	14,631	7,727,465	153,143
Totals	6,988,152	$1,114,532	94,587,698	$15,551,779
Misc. rubber (above), 1,000 *lbs.*	6,988	$1,114,532	94,587	$15,551,779
Crude rubber ...... 1,000 *lbs.*	163,875	27,970,900	1,381,283	239,770,240
Totals .... 1,000 *lbs.*	170,863	$29,085,432	1,475,870	$255,322,019
Chicle, crude .... *lb.*	999,171	$356,162	9,168,948	$3,011,833
MANUFACTURED—*Dutiable*				
Rubber tires .... *no.*	2,400	$4,924	36,568	$202,409
Rubber boots, shoes and overshoes .... *prs.*	46,831	11,679	115,208	29,611
Rubber soled footwear with fabric uppers .... *prs.*	90,780	20,059	1,090,037	206,128
Golf balls .... *no.*	28,308	3,105	561,826	53,000
Lawn tennis balls .... *no.*	......	......	908,721	89,053
Other rubber balls .... *no.*	57,792	1,184	1,717,947	46,686
Other rubber toys	......	741	......	20,517
Hard rubber combs ...... *no.*	......	......	......	......
Other manufactures of hard rubber	......	4	......	13,246
Friction or insulating tape .. *lb.*	89	84	52,984	33,418
Belts, hose, packing, and insulating material	......	541	......	76,787
Druggists' sundries of soft rubber	......	1,248	......	29,606
Inflatable swimming belts, floats, etc. .... *no.*	1,440	93	430,283	29,139
Other rubber and gutta percha manufactures	......	33,397	......	289,827
Totals	......	$77,059	......	$1,119,427

Exports of Foreign Merchandise

	Quantity	Value	Quantity	Value
RUBBER AND MANUFACTURES				
Crude rubber .... *lb.*	708,838	$123,216	15,071,504	$3,050,694
Balata .... *lb.*	23,149	9,552	338,837	108,333
Other rubber, rubber substitutes and scrap .... *lb.*	1,216	246	173,363	23,943
Rubber manufactures (including toys)	......	3,567	......	35,049
Totals	......	$136,581	......	$3,218,019

Exports of Domestic Merchandise

	Quantity	Value	Quantity	Value
RUBBER AND MANUFACTURES				
Reclaimed .... *lb.*	1,604,405	$84,457	22,453,108	$1,122,977
Scrap .... *lb.*	9,918,964	163,402	73,592,091	1,273,319
Cements .... *gal.*	34,661	42,613	347,558	436,358
Rubberized auto cloth. *sq. yd.*	29,931	11,112	227,306	98,809
Other rubberized piece goods and hospital sheetings. *sq. yd.*	179,521	113,732	1,980,783	804,493
Boots .... *prs.*	7,408	16,372	93,409	196,204
Shoes .... *prs.*	10,873	12,922	152,350	104,853
Canvas shoes with rubber soles .... *prs.*	46,318	36,841	483,408	387,576
Soles .... *doz. prs.*	3,001	8,935	37,813	78,899
Heels .... *doz. prs.*	40,299	15,605	261,253	143,324
Soling and top lift sheets .. *lb.*	28,038	7,390	518,854	102,168
Gloves and mittens .. *doz. prs.*	4,963	13,251	85,730	204,481
Water bottles and fountain syringes .... *no.*	24,605	8,439	276,067	93,258
Other druggists' sundries	......	69,436	......	683,895
Gum rubber clothing ..... *doz.*	16,855	29,259	189,257	410,249
Balloons .... *gross*	27,375	23,483	196,768	172,746
Toys and balls	......	43,248	.....	182,957
Bathing caps .... *doz.*	2,427	4,387	45,616	79,604
Bands .... *lb.*	10,702	5,294	154,245	73,053
Erasers .... *lb.*	16,880	9,084	210,430	117,928
Hard rubber goods				
Electrical battery boxes. *no.*	15,070	11,377	211,873	151,273
Other electrical .... *lb.*	46,532	15,958	456,498	168,456
Combs, finished .... *doz.*	16,735	12,354	188,383	108,289
Other hard rubber goods	......	13,389	......	145,485
Tires				
Truck and bus casings. *no.*	89,709	2,917,928	465,979	11,648,629
Other auto casings ..... *no.*	46,776	571,521	430,361	4,758,895
Tubes, auto .... *no.*	108,393	452,799	690,393	1,728,611
Other casings and tubes .. *no.*	16,038	115,345	104,593	865,539
Solid tires for automobiles and motor trucks .... *no.*	238	5,367	4,574	92,165
Other solid tires .... *lb.*	23,089	4,373	326,087	57,438
Tire sundries and repair materials .... *lb.*	272,638	85,865	2,204,805	633,433
Rubber and friction tape .. *lb.*	49,862	14,401	612,862	173,922
Fan belts for automobiles .. *lb.*	28,641	15,097	321,848	172,763
Other rubber and balata belts .... *lb.*	291,972	142,477	2,653,566	1,404,768
Garden hose .... *lb.*	63,904	11,517	726,745	150,331
Other hose and tubing .... *lb.*	469,865	212,215	6,978,036	2,919,157
Packing .... *lb.*	150,898	67,448	1,257,152	604,908
Mats, matting, flooring, and tiling .... *lb.*	116,087	14,591	959,454	131,827
Thread .... *lb.*	9,669	9,305	573,428	425,585
Gutta percha manufactures. *lb.*	81,179	30,003	1,090,130	337,772
Latex (d.r.c.) and rubber sheets processed for further manufacture .... *lb.*	66,848	16,191	1,008,201	274,437
Other rubber manufactures ..	......	185,299	......	1,895,826
Totals	......	$5,644,082	......	$35,616,660